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CHARACTERIZATION AND PHYLOGENETIC ANALYSIS OF USUTU VIRUS ISOLATES IN SARDINIA

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Chapter 1

1.1 Classification of *Usutu* virus (USUV)

Usutu virus (USUV) (**fig. 1.1**) is an African mosquito-borne flavivirus, belonging to the *Japanese* encephalitis virus (JEV) serocomplex.

USUV was originally isolated from mosquitoes (*C. Neavei*) collected in Ndumu, Natal, South Africa in 1959 and named after the river homonymous (Usutu river) where it was found. It is one of the most neglected Old World encephalic flaviviruses.

USUV is a zoonosis and, like other Flavivirus, is able to propagate both in Arthropods and in Vertebrates, including Humans.

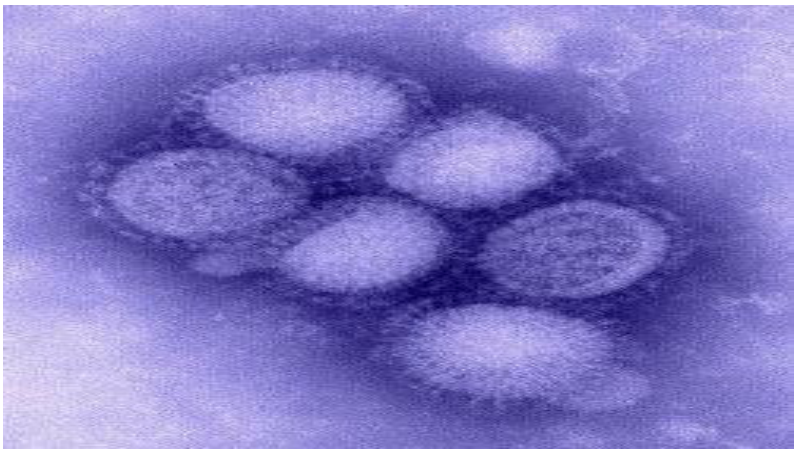

Fig. 1.1 *Usutu* virus (from Steinmetz HW *et al.* 2010)

USUV is classified in the group of *Arbovirus*, family *Flaviviridae*, genus *Flavivirus* and the type specie is the *Yellow fever* virus (YFV).

The genus *Flavivirus,* of the *Flaviviridae* family, is composed of more than 70 viruses. Among them we can find the *Japanese* encephalitis virus (JEV), *West Nile* virus (WNV),

Murray Valley encephalitis virus (MVEV), *Dengue* virus (DENV) and *Yellow fever* virus (YFV) which are all extremely dangerous to human health. (Karabatsos N. 1985; Kuno *et al.* 1998; Poidinger *et al.* 1996).

In addition, USUV is closely related to several human and animal pathogenic members of this family including WNV, MVEV and JEV (Calisher CH *et al.* 2003).

We can classify the members of the genus *Flavivirus* in two different ways:

- Based on cross-neutralization studies, they have been divided into 8 antigenic complex (**table 1.1**) (Calisher CH *et al.* 1989);

Antigenic complex	Viruses
Tick-borne encephalitis	(Russian spring–summer encephalitis, Central European encephalitis), Omsk haemorrhagic fever, louping ill, Kyasanur Forest disease, (Langat, Phnom Penh bat, Carey Island), Negishi, Powassan, Karshi, Royal Farm
Rio Bravo	Rio Bravo, Entebbe bat, Dakar bat, Bukalasa bat, Saboya, Apoi
Japanese encephalitis	Japanese encephalitis, Murray Valley encephalitis, Kokobera, Alfuy, Stratford, St Louis encephalitis, Usutu, West Nile, Kunjin, Koutango
Tyuleniy	Tyuleniy, Saumarez Reef, Meaban
Ntaya	Ntaya, (Tembusu, Yokose), (Israel turkey meningoencephalitis, Bagaza)
Uganda S	Uganda S, Banzi, Bouboui, Edge Hill
Dengue	Dengue 1, dengue 2, dengue 3, dengue 4
Modoc	Modoc, Cowbone Ridge, Jutiapa, Sal Vieja, San Perlita

* Viruses more closely related to each other than to others of the antigenic complex are in parentheses.

Table 1.1 Antigenic serocomplex of Flavivirus (from Calisher CH *et al.* 1989)

Most of these viruses are serologically classified into 8 antigenic serocomplex, however 17 others viruses are not sufficiently related to each other to include them in any of these complexes.

USUV belongs to the JEV serocomplex.

- Based on phylogenetic analysis carried out on partial nucleotide sequences of the NS5 coding and 3' noncoding regions (Kuno *et al.* 1998).

Virus[a]	Clade	Antigenic complex
Non-vector cluster		
CFA		
Apoi		
San Perlita; Jutiapa	I	Modoc
Montana myotis leukoencephalitis; **Modoc; Cowbone Ridge; Sal Vieja**	II	Modoc
Bukalasa bat; Dakar bat; Rio Bravo; Carey Island; Phnom Penh bat; Batu Cave	III	Rio Bravo
Tick-borne cluster		
Gadgets Gully; **Royal Farm; Pow; Karshi; KFD; Langat; Omsk HF; TBE-far eastern subtype; RSSE; TBE-CE; Negishi**	IV	TBE
Kadam; **Tyuleniy; Saumarez Reef; Meaban**	V	Tyuleniy
Mosquito-borne cluster		
Edge Hill; Bouboui; Uganda S; Banzi; Jugra; Saboya; Potiskum	VI	Uganda S
Sepik; YF	VII	
Sokuluk; Entebbe bat; Yokose	VIII	
DEN-1 to -4	IX	DEN
Kedougou		
Zika; Spondweni	X	
SLE; Rocio; Ilheus; **Tembusu**; THCAr; **Ntaya; Israel turkey meningoencephalitis; Bagaza**	XI	Ntaya
Naranjal; Bussuquara; Aroa; Iguape	XII	
Kokobera; Stratford	XIII	JE
Cacipacore; Yaounde; **Koutango; Kunjin; WN; Alfuy; JE; Murray Valley encephalit1is; Usutu**	XIV	JE

[a] The viruses in boldface belong to the corresponding antigenic complex to the right.

Table 1.2 Assignment of *Flaviviruses* to clusters and clades (from Kuno *et al.* 1998)

If we analyse the genetic features of the *Flavivirus* genus, it is segregated into 14 clades belonging to 3 different clusters. Each cluster is then divided in different clades, as shown in the table (**1.2**) above.

USUV is classified in the JEV group of the mosquito-borne cluster, together with *Cacipacore* virus (CPCV), *Koutango* virus (KOUV), JEV, MVEV, *Alfuy* virus (ALFV), *St Louis* encephalitis virus (SLEV), WNV, *Kunjin* virus (KUNV), and *Yaounde* virus (YAOV) (Heinz *et al.* 2000).

1.2 Molecular features of USUV

Similar to other flaviviruses, USUV is a spherical, small-enveloped virus with a diameter 40-60 nm. The virion comprises three structural proteins, the capsid (C), the membrane (M), and the envelope (E) proteins and an 11 kb single-stranded, positive sense RNA genome (Rice *et al.* 1986). The genomic RNA (**fig 1.2**) contains a 5' cap structure, but lacks a polyadenylated tail. It acts as mRNA for translation of a single open reading frame (ORF) encoding the viral proteins as a large polyprotein that is co- and post- translational processed by cellular and viralproteases into at least 10 separate products. The N-terminal region encodes the structural proteins C, pre-M, and E, followed by the nonstructural proteins NS1 (soluble complement-fixing antigen), NS2A and NS2B, NS3 (serine protease/RNA helicase), NS4A, 2K, NS4B, and NS5 (RNA dependent RNA polymerase/methyltransferase) (Rice *et al.* 1985).

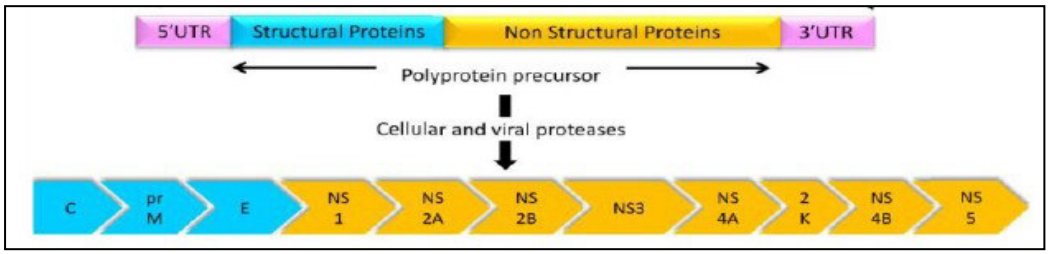

Fig. 1.2 USUV: its gene structure and the proteins encoded by its genome.

The polyprotein precursor is cleaved by cellular and viral proteases to yield three structural proteins C (97-474 nt), prM (475-975 nt), and E 976-2475 nt) and eight non-structural proteins NS1 (2476-3531 nt), NS2A (3532-4212 nt), NS2B (4213-4605 nt), NS3 (4604-6462 nt), NS4A (6463-6840 nt), 2K (6841-6909 nt), NS4B (6910-7683 nt), and NS5 (7684-10398 nt) (from Ashraf *et al.* 2015).

At the 5'-terminal there is a UTR which is long about 100 nt and, at the 3'-terminal, is usually long about 670 nt.

It is noticeable how the UTRs play a crucial role in the *Flavivirus*, not only for the initiation and for the regulation of the translation but also for the replication and the virion assembly. In particular the 3'-UTRs of various flaviviruses demonstrate extensive heterogeneity in size and sequence of their proximal parts where long deletions, insertions, sequence repeats and even poly (A) stretches have been observed (Mandl *et al.* 1993; Wallner *et al.* 1995; Wang *et al.* 1996; Gritsun *et al.* 1997). In contrast, the distal part of the 3'-UTR (330–400 nucleotides in length) exhibits relatively high sequence identity and was previously defined as the functional 'core' element of the flaviviral 3'-UTR (Wallner *et al.* 1995).

The functions of the 3'-UTR can be mediated through signal sequences and elements of RNA secondary structure. Indeed, a number of conserved sequence motifs have been identified in the 3'-UTR of flaviviruses (Hahn *et al.* 1987; Mandl *et al.* 1993), although there is no direct evidence for their function.

On the other hand, a region of about 100 nt at the 3'-terminal of all flaviviruses is known to form a "long stable hairpin structure" (3'-LSH) which shows conformational conservation despite differences in sequence. This would suggest that the 3'- LSH is under selective constraint and, therefore, of functional importance (Grange *et al.* 1985; Brinton *et al.* 1986; Hahn *et al.* 1987; Mohan and Padmanabhan, 1991; Mandl *et al.* 1993; Shi *et al.* 1996). The 3'-LSH can exhibit a specific interaction with host cellular proteins (Blackwell and Brinton, 1995, 1997) and viral polymerase (Chen *et al.* 1997), which points to the direct involvement of this structure in the initiation of viral minus strand RNA synthesis (Proutsky *et al.* 1999).

In 2004, with the use of phylogenetic analyses to examine the whole genome sequence of USUV, it was established the inclusion of one African (SouthAfrica-1959) and one European (Vienna-2001) lineage of USUV (**fig.1.3**) (Bakonyi *et al.* 2004). These two strains

are 97% and 99% identical at nucleotide and amino acid level, respectively (Bakonyi *et al.* 2004).

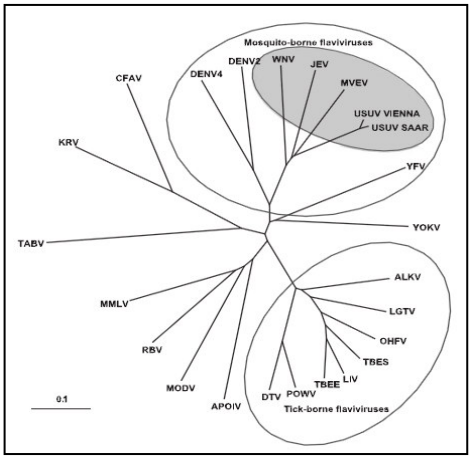

Fig.1.3 Phylogenetic tree illustrating the genetic relationship between flaviviruses based on their complete genome sequences. (from Bakonyi *et al.* 2004)

A research was published in 2016 which established that USUV can be classified into six distinct lineages and that the most recent common ancestor of the recent European epizootics emerged in Africa at least 500 years ago (Engel *et al.* 2016).

Currently, the virulence of the specific USUV lineages is unknown, and further studies are necessary to determine the biological characteristics of each lineage.

When comparing USUV to other JEV serocomplex viruses, the closest relative that can be found is MVEV, which exhibits 73% and 82% identity at the nucleotide and amino acid levels, respectively. JEV and WNV exhibit 71% and 68% identity with USUV at the nucleotide level and 81% and 75% at amino acid level, respectively (Bakonyi *et al.* 2004).

1.3 Cellular Tropism and Pathogenesis of USUV

USUV can infect cells of various tissues types derived from humans and a wide variety of animal species (Bakonyi *et al.* 2005).

USUV infection on birds is often characterizes by encephalitis, neuronal necrosis, hepatosplenomegaly, myocardial degeneration and necrosis of the liver and spleen (Chvala *et al.* 2004; Bakonyi *et al.* 2004; Calzolari *et al.* 2012; Weissenböck *et al.* 2003). However the demyelination of infected neurons was found to be a unique feature of USUV infection (Weissenböck *et al.* 2004).

Upon infection, human can develop a variety of signs such as encephalitis, meningitis and fever. USUV is not considered a significant human pathogen but it is rarely pathogenic in immune-compromised patients (Cavrini *et al.* 2009; Pecorari *et al.* 2009). These organ lesions can be regarded as a cause of death, because they were generally associated with sites of viral replication. However, not all of the mentioned lesions are always existing together.

USUV does not have a specific cell, tissue or organ tropism but, on the contrary, it is present in a large variety of cells (neurons, different epithelial cells and mesenchymal cells). The cause of death in birds is most likely due to a multi-organ failure, and brain lesions seem to play a central role (Chvala *et al.* 2002).

After the uptake into the cell by endocytosis, the viral particles are transported to the endosome. Here, the acidic environment enables the release of the capside into the cytoplasm. After replication of the genome and synthesis of the viral proteins, the viral particles are assembled and the maturation takes place in the endoplasmic reticulum and are released by exocytosis.

In relation to genus *Flavivirus*, autophagy is associated with multiple aspects of replication and pathogenic of some members of this genus, including DENV (Khakpoor *et al.* 2009); JEV (Li *et al.* 2012) and USUV (Blàzquez AB *et al.* 2013).

Some viruses, including USUV, can take advantage of the autophagic process by incorporating the components of this cellular pathway in their own replication (Blàzquez AB *et al.* 2013; Miller S and Krijnse-Locker J 2008).

"Autophagy" literally means "self-digestion" as it is a cellular process by which cytoplasmic components are isolated into double-membrane vesicles and degraded to maintain cellular homeostasis. In addition to this, "Autophagy" constitutes an evolutionarily ancient process of survival during different forms of cellular stress, including infection with viruses (Orvedhal A and Levine B 2008; Mizushima *et al.* 2008).

Upon infection, USUV induced the Xbp-1 pathway activation of the unfolded protein response, revealed by the splicing of Xbp-1 mRNA. It also increased cytoplasmic aggregation of microtubule-associated with the lipidated form of "protein 1 light chain 3" (LC3) (Weissenböck *et al.* 2004), which are considered as marker of autophagosome formation during viral infections that facilitates replication and immune evasion (Yu *et al.* 2006).

1.4 Enzootic cycle, reservoir animals and "bridge-vectors"

The natural transmission cycle (**fig. 1.4**) occurs between ornithophilic mosquitoes (vector) and birds that serve as reservoir or amplifying host.

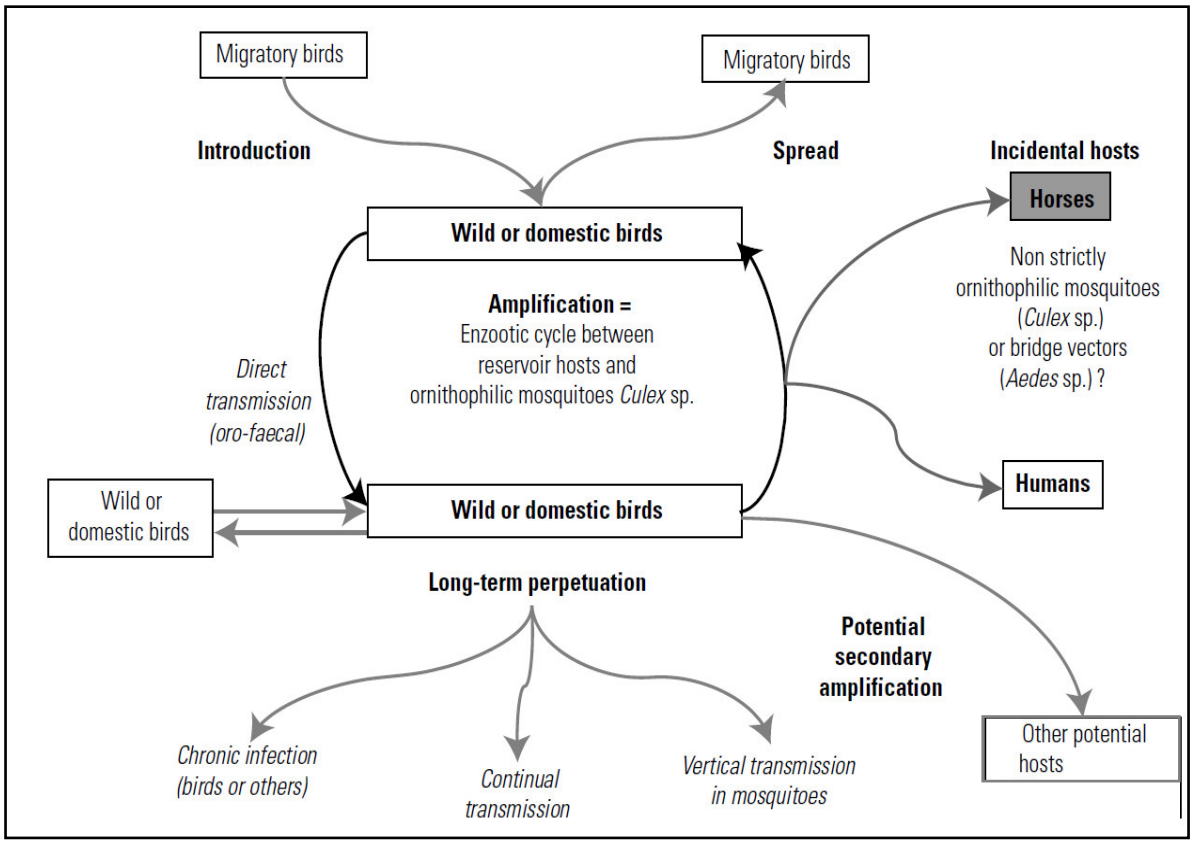

Fig. 1.4 *Usutu* virus transmission cycle (from Pradier *et al* 2012)

Many mosquitoes and avian species (**table 1.3**) are involved in perpetuating the USUV life cycle (Vazquez A *et al.* 2011; Steinmetz HW *et al* 2011).

Species	Common Name	Country (year)
Dendrocopos major	Great spotted woodpecker	Belgium (2014)
Pyrrhula pyrrhula	Bullfinch	
Columba livia domestica	Domestic pigeon	Greece (2014)
Turdus philomelos	Song thrushes	Spain (2012)
Turdus merula	Eurasian blackbird	Italy (2010–2011) Germany (2011) Hungary (2003–2006) Austria (2001–2005)
Alcedo atthis	Common kingfisher	Germany (2011)
Serinus canaria domestica	Canary	
Alectoris rufa	Partridge	Italy (2010–2011)
Asio otus	Long-eared owl	
Caprimulgus europaeus	Nightjar	
Garrulus glandarius	Eurasian jay	
Larus michahellis	Yellow-legged gull	
Pica pica	Eurasian magpie	
Streptopelica decaocto	Eurasian collared dove	
Ardea cinerea	Grey heron	Germany (2011)
Merops apiaster	Eurasian bee-eater	Italy (2010–2011)
Passer domesticus	House sparrow	
Picus viridis	Eurasian green woodpecker	
Sturnus vulgaris	Common starling	
Strix nebulosa	Great grey owl	Germany (2011) Austria (2001–2002)
Gallus gallus domesticus	Chicken	Italy (2007–2009) Switzerland (2006–2007) England (2006)
Spheniscus humboldti	Humboldt penguin	Switzerland (2006–2007)
Phoenicopterus ruber	Greater flamingo	
Dacelo novaeguineae	Laughing kookaburra	
Ciconia ciconia	White stork	Austria (2006–2007)
Leptoptilos crumeriiferus	Marabou stork	
Neophron percnopterus	Egyptian vulture	
Bubo bubo	Eurasian eagle owl	
Bubo scandiacus	Snowy owl	
Strix uralensis	Ural owl	

Table 1.3 Avian species infected with USUV in Europe (from Ashraf *et al.* 2015)

Mosquitoes are not strictly ornithophilic, in particular the genus *Culex*, are called "bridge-vector" because facilitate viral transmission to incidental host like humans, horses and rodents. Humans and horses are considered dead-end hosts due to their inability to develop a sufficient viremia to infect mosquitoes (Kramer *et al.* 2008; Weaver *et al.* 2010).

In 2015 in Germany USUV was also isolated from bats for the first time (Cadar *et al.* 2014) proving that it is able to emerge in other hosts. This observation raised questions regarding the USUV host range and the ability to adapt to new hosts.

1.5 Epidemiology of USUV

Following its discovery in South Africa in 1959, USUV was found in other African countries such as CAR (Central Africa Republic) (1969; 1981); Senegal (1974; 1993; 2007) (Adam F and Digoutte J-P 2014; Cornet M *et al* 1979; Nikolay B *et al* 2011; Chevalier *et al* 2009) and Tunisia (2014) (Ben Hassine *et al* 2014). USUV was typically isolated from mosquitoes, except for the strain "CAR 1981" which was isolated from a man who showed fever and rush (Institut Pasteur de Dakar 1984). The virus then moved from Africa into Europe, presumably carried by migratory birds and their related mosquitoes.

The first emergence of USUV in Europe was reported in Austria in 2001 and it derived from an episode of mass mortality in Eurasian blackbirds (*Turdus merula*) (Weissenböck *et al.* 2002).

Interestingly, a similar death of blackbirds was also reported in Italy in 1996 (Mani *et al.* 1998) but the causes, in this instance, remained unknown. Only in 2013, the partial nucleotide sequence of that unknown virus was compared with the Austrian strain "Vienna

2001", revealing a complete identity sequence (Weissenböck *et al.* 2013). On the base of this data, the emergence of USUV in Europe happened much earlier than previously thought.

In the following years, USUV was found in several other European countries (**fig. 1.5**) with virus isolation from mosquitoes, birds and bats. These countries included Hungary (2003-2006) (Bakonyi *et al.* 2007); Switzerland (2006) (Steinmetz HW *et al* 2011); Spain (2006-2009) (Vàzquez *et al.* 2011; Busquets *et al.* 2008); Italy (2006) (Calzolari *et al.* 2009; Manarolla *et al.* 2010; Savini *et al.* 2011; Tamba *et al.* 2011); Germany (2013) (Cadar *et al.* 2014) and Belgium (2014) (Garigliany *et al.* 2014)

USUV was detected in Sardinia for the first time in 2013 from mosquito's pool (*C. pipiens*).

Moreover, USUV infection has also been proved serologically in birds in England (2001-2004) (Buckley *et al.* 2006), Czech Republic (2005) (Hubàlek *et al.* 2008), Spain (2003–2006) (Figuerola *et al.* 2007), Poland (2006) (Hubàlek *et al.* 2008), Switzerland (2006) (Steinmetz HW *et al.* 2007), Germany (2007) (Linke *et al.* 2007), Italy (2007) (Lelli *et al.* 2008), and Greece (2014) (Chaintoutis *et al.* 2014). The recurrence of the virus in Italy (2010–2011) (Calzolari *et al.* 2012; Calzolari *et al.* 2013), Germany (2011) (Becker *et al.* 2012), Spain (2012) (Höfle *et al.* 2013), and Czech Republic (2011–2012) (Hubàlek *et al.* 2014) suggests persistence of the transmission cycle in the affected areas, possibly through overwintering mosquitoes (Vàzquez *et al.* 2011).

In the summer 2016, the virus was detected for the first time in the continent of South America, specifically in Colombia (Paniz-Mondolfi AE *et al.* 2016).

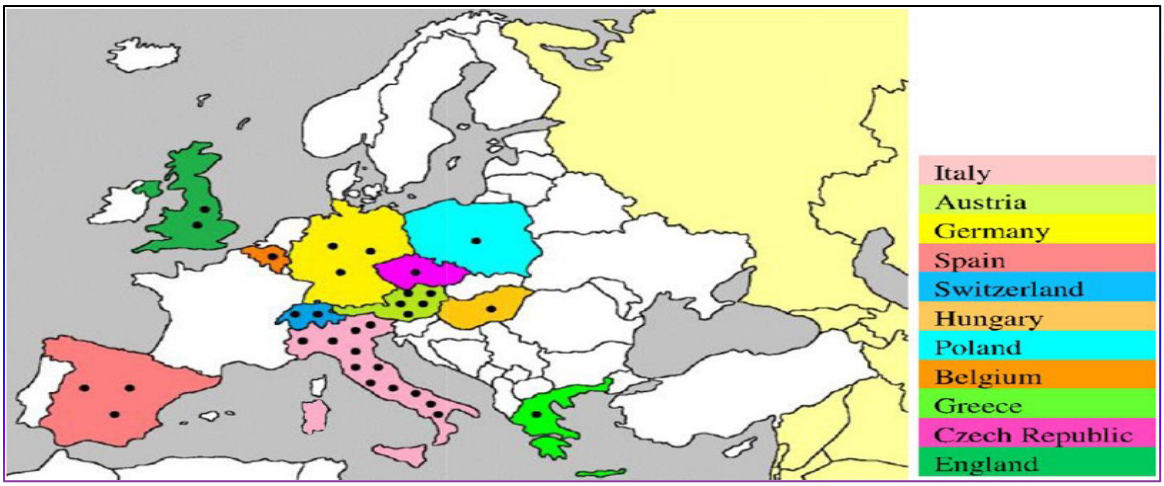

Fig. 1.5 Geographic locations of USUV-related epidemiological studies on birds and mosquitoes in Europe (from Ashraf *et al.* 2015).

Following its emergence in Europe, USUV has proven to be highly pathogenic for several species of wild birds, especially Eurasian blackbirds (*Turdus merula*) (Bakonji *et al.* 2004).

In addition to avian species, USUV has also been detected in humans. The first reported case of USUV infection was observed in Africa in two patients with fever, rash and jaundice (Nikolay *et al.* 2011).

Subsequently, in Europe two USUV-positive cases of meningoencephalitis were reported in immune-compromised patients in Italy (Cavrini *et al.* 2009; Pecorari *et al.* 2009; Gaibani *et al.* 2010). The first case was developed following orthotropic liver transplantation with an infected organ donor, and the second case was found in a cancer patient.

Recently, the first 5 cases of USUV specific-IgG positive sera in healthy blood donors have been reported, confirming the theory that USUV actively circulates amongst asymptomatic subjects in Europe (Gaibani *et al.* 2012; Allering *et al.* 2012).

Therefore, the introduction onto a new continent of a previously exotic flavivirus that is closely related to other pathogenic flavivirus is a potential serious threat for a wide range of avian and mammalian species, including human (Bakonyi *et al.* 2004).

Chapter 2

Aim of the Project

This research has been carried out by the Veterinary Medicine Department, Infectious Diseases Division of the University of Sassari, and the *Istituto Zooprofilattico Sperimentale della Sardegna* "G. Pegreffi", Animal Health Department, Virology and Entomology Division.

The aim of the project is the study of USUV circulating in Sardinia through the screening of surveillance samples.

On the base of positive samples, we have then proceeded to full genomic sequencing through the technique of "Primer-Walking" with the use of primers which have been designed by us.

From the data acquired, we have then proceeded to molecular characterization and phylogenetic analysis of strains that have been found, with the aim of investigating mutations associated with increased virulence or associated with geography - or host-adaptation.

Chapter 3

Materials and Methods

3.1 Entomological surveillance

The aim of entomological surveillance is to identify the mosquitoes involved in viral transmission and their seasonal abundance in the framework of the entomological activities, as defined in the Italian surveillance plan for WNV. In Sardinia we are also able to expand this surveillance plan for USUV.

In recent years, there have been increasing global reports of diseases due to *Arboviruses* (arthropod-borne viruses) (Gratz NG, 2006; Weaver SC and Reisen WK, 2010; Hubàlek Z, 2008). The detection of viruses in Invertebrate vectors and Vertebrate reservoir hosts is an important part of public health surveillance systems that allows the analysis of the intensity and seasonality of viral circulation in the environment. It provides data for the timely planning of preventive measures such as blood donation screening (CDC Guidelines for Surveillance, Prevention, & Control. 3rd revision, 2011).

Surveillance based on mosquitoes, wild and synanthropic birds sampling can provide early detection of the virus circulation before the onset of the disease in humans and horses (Calzolari *et al.* 2015).

Entomological surveillance in Sardinia was conducted using CDC light-traps operating for 24 hours in 35 geo-referenced sites every two weeks, from April until October 2015 or until two consecutive catches were detected without finding mosquitoes.

Mosquitoes were identified to specie level by using morphological characteristics according to four classification keys (Stojanovich CJ and Scott HG, 1997; Schaffner *et al.* 2001; Severini *et al.* 2001; Becker *et al.* 2010).

Mosquitoes were pooled according to species, sex, place and date of sampling and on whether they were engorged or not, with a maximum of 50 individuals per pool.

To avoid cross-contamination due to possible loss of mosquito parts, the pools were obtained by handling specimens individually with tweezers.

The batches of mosquitoes were stored in 2 ml polypropylene cryotubes (Eppendorf) and frozen at -80 °C, up to their biomolecular analysis.

One tungsten ball (Tungsten Carbide Beads, Qiagen) of 3 mm in diameter, was added to each 2 ml tube. Different amount of PBS 1X were added to each tube according to the number of stored mosquitoes (350 ul up to 10 specimens; 500 ul up to 30 specimens; 600 ul up to 50 specimens).

The samples were then ground for 1 min and 30 sec (frequency 17 1/s) using the homogenizer TissueLyserII (Qiagen) and centrifuged in a refrigerated centrifuge at 10,000g for 20 minutes at 4 °C. Finally, samples were submitted to bio-molecular analysis through specific Real Time RT-PCR for the detection of USUV (Cavrini *et al.* 2011).

3.2 Birds surveillance

A total of 525 birds were collected within the specific wildlife population control program in 2015 and were checked for the presence of USUV.

The active surveillance was carried out on synanthropic birds. Weekly samples of approximately 20 - 40 birds that were caught or shot were collected. Monitoring mainly focused on the European magpie (*Pica pica*); Eurasian jay (*Garrulus glandarus*) and in particular on the Hooded crow (*Corvus cornix*).

The corvid is considered as a pest, due to its wide diffusion and eating habitat.

The passive surveillance was carried out on animals found dead in the field or deceased in wildlife rehabilitation centers.

Birds were necropsied and for each specimen we took the brain and a pool consisting of spleen, heart and kidney separately.

Homogenate was made to 10% in PBS (0.5 g sample in 5 ml PBS 1X). Samples were then ground using the homogenizer Omni Bead Ruptor 24 (Omni International, Inc., USA) with the following program: two steps to 45 sec with a pause for 15 sec; frequency 5,65 1/s. Twenty (2.8 mm in diameter) Ceramic Beads Bulk (Omni International, Inc., USA) was added to each 5 ml tube.

Viral RNA was extracted from 100 ul homogenate sample (pool of mosquitoes; organs) using the commercial kit Biosprint 96 One-for-all Vet Kit (384) (Qiagen) according to the manufacturer's instructions.

After RNA extraction with the automatic nucleic acid extractor Biosprint 96 (Qiagen) we submitted them to biomolecular analysis; samples from every bird were processed individually. All the samples were assessed with a specific Real-time RT-PCR for the detection of USUV RNA (Cavrini *et al.* 2011).

3.3 Phylogenetic analysis

For phylogenetic analysis, the most informative genes of USUV, and generally for *Flavivirus* reported in bibliography, are the gene *E*, which encodes Envelope protein, and the gene *NS5*, which encodes RNA dependent RNA polymerase.

Initially, a preliminary amplification of partial *NS5* and *E* gene region was made before sequencing the entire genome of our isolates of USUV.

The purpose of this step was not only related to phylogenetic analysis but also to obtain information about the origin of our isolates (example European or Africans lineages), in order to develop specific primers for the whole genome sequencing and to have a strong confirmation of USUV positivity in our isolate based on data sequence.

Firstly, we tried to use the degenerated primers specific for *Flavivirus* designed by Sanchez-Seco MP *et al.* 2005 and Kuno *et al.* 1998 but unexpectedly we did not have any amplification on our samples.

After these negative results, we designed new primers to cover the partial genomic regions of the genes *E* and *NS5*. Primers are developed on viral variant obtained from a positive sample.

The pairs of primer designed by us were:

gene *NS5*:

Usuv8885 F TAAGAGGAAGGTCAACAGCA /

Usuv9597 R TTCCTGCCCAATCACTCCTT (712 bp)

gene *E*:

Usuv1124 F CACGAACCTGGCTGAAGTGA /

Usuv1789 R CTGGAAYAGCTCCTGCCAAK (665 bp)

Thermo cycler parameters (except T° annealing 60°C) and PCR mix reaction are the same to the primers used for the full-length genome amplification.

We analised all the isolates found but surprisingly we obtained only the partial sequence of *NS5* and *E* genes of two isolates, 91418 (2013) and 62059/4 (2015).

After sequencing, they confirmed the USUV positivity and a very close relation with Italian strains "Bologna2009" and "Italia2009".

Based on these results, however, we proceeded into analysing only the isolates 91418 (2013) and 62059/4 (2015).

With data analysis, the gene *NS5* has proved globally much more informative in comparison to the gene *E*, and for this reason we decided to use the gene *NS5* for the phylogenetic analysis of USUV.

List USUV strains used for phylogenetic analysis:

1. Usutu virus strain UR-10-Tm polyprotein gene, complete cds KX555624.1
2. Usutu virus strain OS1-10-Tm polyprotein gene, complete cds KX555628.1
3. Usutu virus strain SE1-10-Tm polyprotein gene, complete cds KX555626.1
4. Usutu virus strain Bologna 2009, complete genome HM569263.1
5. Usutu virus strain Italia 2009, complete genome JF266698.1

6. Usutu virus strain Vienna 2001 from Austria, complete genome AY453411.1
7. Usutu virus strain Meise H polyprotein gene, complete cds JQ219843.1
8. Usutu virus isolate Budapest, complete genome EF206350.1
9. Usutu virus strain V86, complete genome KJ438781.1
10. Usutu virus strain V20, complete genome KJ438769.1
11. Usutu virus strain V191, complete genome KJ438779.1
12. Usutu virus isolate S.nebulosa-7890/Fra/2016, complete genome KY128481.1
13. Usutu virus strain V248, complete genome KJ438774.1
14. Usutu virus strain V321, complete genome KJ438766.1
15. Usutu virus strain 3358, complete genome KJ438721.1
16. Usutu virus gene for polyprotein, genomic RNA, isolate BH65/11-02-03 HE599647.1
17. Usutu virus strain VB-15-Tm polyprotein gene, complete cds KX555629.1
18. Usutu virus strain V211, complete genome KJ438764.1
19. Usutu virus strain V72, complete genome KJ438761.1
20. Usutu virus strain V49, complete genome KJ438756.1
21. Usutu virus strain V210, complete genome KJ438763.1
22. Usutu virus strain V10, complete genome KJ438760.1
23. Usutu virus strain V245, complete genome KJ438747.1
24. Usutu virus strain V93, complete genome KJ438746.1
25. Usutu virus strain 6424, complete genome KJ438736.1
26. Usutu virus strain 1477, complete genome KJ438705.1
27. Usutu virus isolate BAT2USUTU-BNI, complete genome KJ859683.1
28. Usutu virus isolate BAT1USUTU-BNI, complete genome KJ859682.1
29. Usutu virus isolate HB81P08, complete genome KC754955.1
30. Usutu virus isolate ArD101291, complete genome KC754956.1
31. Usutu virus isolate ArD192495, complete genome KC754957.1
32. Usutu virus strain Bonn, complete genome KM659877.1
33. Usutu virus isolate S.nebulosa-6004/NL/2016, complete genome KY128482.1
34. Usutu virus isolate ArD19848, complete genome KC754954.1
35. Usutu virus strain SAAR-1776 from South Africa, complete genome AY453412.1
36. Usutu virus strain Spain MB119/06, complete genome KF573410.1

As outgroup we included the *Murray Valley* encephalitis virus (MVEV), by using the reference strain "MVEV_NC000943.1".

Pairwise/multiple sequence alignments and sequences similarities were calculated using the ClustalX software (Larkin *et al.* 2007).

The evolutionary history of USUV was inferred using the Neighbor-Joining method (NJ) (Saitou and Nei 1987) identified as the best-suited evolutionary model for our data. The phylogenetic tree was obtained by applying Neighbor-Joining (NJ) algorithms to a matrix of pairwise distances estimated using the maximum composite likelihood (MCL) method (Tamura *et al.* 2004) and were calculated as units of the number of base substitutions per site. A discrete Gamma distribution was used to model evolutionary rate differences among sites (parameter = 0.45880082). The analysis involved 39 nucleotide sequences. Codon positions included were 1st+2nd+3rd+Noncoding. Positions containing gaps and missing data were disposed of.

A total of 1490 positions were included in the final dataset and evolutionary analyses were conducted in MEGA6 (Tamura *et al.* 2013). Statistical support for internal branches (shown next to the branches) of the trees was evaluated by bootstrapping with 100 iterations (Felsenstein 1985). NJ (Saitou and Nei 1987) trees and consensus values were generated using the same software.

3.4 Whole genome sequencing Protocol

Regarding the molecular characterization of USUV, it is very important to know the complete genome sequence, because there are many hot points for the virulence spread in the viral genome.

However, initially we had to solve a problem. In fact, in the current method of sequencing the whole genome of USUV with "Primer-Walking", we had too many PCR reactions, and this was not suitable especially with a small amount of RNA sample to work with, like in our case.

To solve our problem we developed a new protocol divided in 4 steps:

1) cDNA optimization
2) new primers design to cover the whole genome in a few PCR reactions
3) PCR products cloning
4) Sequencing

1. cDNA optimization

The first step we took was the cDNA optimization. At first we made two different types of cDNA using two different specific primers for USUV: UsuvF1 and Usuv11066Rdeg. This step was undertaken to ensure the retro-transcription of the entire viral genome.

Then, we tested several combinations of primer concentration and different amount of sample by using a specific Real time RT-PCR for USUV (Cavrini *et al.* 2011). This was

done to try to limit the amount of RNA sample. The best arrangement was 20 uM primer concentration and 2,5 ul of RNA sample.

cDNA Protocol

We used the commercial Kit "SuperscriptII reverse transcriptase", (Invitrogen).

It is divided in 3 steps:

1st Step Program name: "**65 Usutu**"

Add:

- RNA 2.5 ul
- Primer 1 ul
- BSA 1X 0.5 ul
- dNTPs 10 mM 1 ul
- H_2O milliQ 4.5 ul

for 5' at 65 °C ;

2nd Step Program name: "**Mix Usutu**"

Add:

- 5X first-strand buffer 4 ul
- DTT 0,1 M 2 ul
- RNasi OUT 40U/ul 1 ul

Mix gently pipetting up and down, then:

for 2' at 42 °C ;

3rd Step Program name: "**cDNA Usutu**"

Add:

- 1 ul *reverse transcriptase* 200 U/ul

Mix gently pipetting up and down, then:

for 50' at 42 °C → for 15' at 70 °C ;

2. New primers design to cover the whole genome in a few PCR reactions

We designed new primers that overlapped between them to cover the whole genome in a few PCR reactions. Primers are developed on viral variant obtained from a positive sample.

To design our primers we aligned several strains of USUV from African and European origin using MUSCLE software (available at http://www.ebi.ac.uk/Tools/msa/muscle/). (See Table **S1** in the supplemental material).

List USUV strains used to design our primers:

Spain_MB119/06_2006 (KF573410)

Dakar_ArD192495 (KC754957)

Senegal_ArD101291_1993 (KC754956)

Germania_V45_2011 (KJ438770)

Germany_V382_2013 (KJ438758)

Vienna_2001 (AY453411)

Bologna_2009 (HM569263)

Italia_2009 (JF266698)

Dakar_ArD19848_1974 (KC754954)

South_Africa_SAAR-1776 (AY453412)

Primer design performed using the free software available on:

www.promix.cribi.**unipd**.it/cgi-bin/**promix**/melting

PCR reaction Protocol (50 ul)

We used the commercial Kit "Platinum *Taq* DNA Polymerase" (Invitrogen)

PCR mix:

10X PCR Buffer, -Mg	5 ul
50 mM $MgCl_2$	1.5 ul
10 uM dNTP mix	1 ul
10 uM forward primer	1 ul
10 uM reverse primer	1 ul
Template cDNA	4 ul

Platinum *Taq* DNA Polymerase 2 U/ rxn 0.2 ul

H_2O milliQ, nuclease free 36.3 ul

Thermo cycler parameter:

Initial denaturation 2' at 94°C

30sec at 94°C

30sec at (depending on primers T° melting) } x 35

1'/ Kb (depending on the length of amplified)

Infinite hold at 4°C

T° annealing:

- PCR reactions: **2**; **3**; **5** (using the cDNA made with the primer UsuvF1) and **8** (using the cDNA made with the primer Usuv11066Rdeg) is 60°C ;
- PCR reactions: **4** and **6** is 55 °C (using the cDNA made with the primer UsuvF1).
- PCR reaction **1** is 62 °C (using the cDNA made with the primer Usuv11066Rdeg).
- PCR reactions: **7**; **9**, **10**, **11** and **12** is 58°C (using the cDNA made with the primer Usuv11066Rdeg).

Pairs of primer used for the full-length amplification of USUV genome:

1) UsuvF1deg AGWYGTTBGYCTGYGTGAGC / Usuv327R TGCCGTGGTCTTGTTGATGC (327 bp)

2) Usuv232F TTTGTGCTGGCCTTGATGAC / Usuv1246R CGTACGTGTCCTCAGCTCTC (934 bp)

3) Usuv1124F CACGAACCTGGCTGAAGTGA / Usuv2353R TGATCCAGGACATGCCACCG (1229 bp)

4) Usuv2295F GTACATCAGGTCTTTGGAGG / Usuv4693R TGTAACGGCTCATGATACGG (2398 bp)

5) Usuv4578F TGGCTCACTGTCAAGTACGC / Usuv5509R CAATGTAGCCTCGTGCTGCTAT (931 bp)

6) Usuv5443F ACCTCTTTGTGATGGATGAG / Usuv6935R GTTCTCTCTAACATTCCGTA (1492 bp)

7) Usuv6861F GCTGTGTTTCTGATCTGTGT / Usuv8956R TGGCACTGCTCCATTGGTTC (2095 bp)

8) Usuv8885F TAAGAGGAAGGTCAACAGCA / Usuv9994R ACAACAGGAGCCACATCTGA (1109 bp)

9) Usuv9643F* GAGAACGGAGAAGAAAGGGT / Usuv10823R* ACCAGTTCGCATCACCGTCT (1181bp)

10) UsuvADF* (10646) GAAAGCCCCTCAGAACCGTTTC /

Usuv11066Rdeg AGATCCTGTGGTCTWGTYCC (420 bp) or

11) UsuvADF* (10646) GAAAGCCCCTCAGAACCGTTTC /

Usuv11014R* AGATCCTGTGKTCTWSYYCMCCAYCAG (420 bp) or

12) Usuv10794F** CAAGCGAACAGACGGTGATG /

Usuv11027R* GCGCTCTGTGCCTTGTGGTTGAT (233 bp)

Pairs of primer used for closing gap (because the amplicon was too long to be sequenced in one-step by Sanger's method) in reactions **4** and **7**:

1) Usuv6901F GTGGCTGCCAATGAATACGGAA / Usuv7845R TGGGTGTCCTCCAGTTTTGT (944bp)

2) Usuv7769F AGAGGCCATCACTGAAGTCG / Usuv8908R CGTTGCTGTTGACCTTCCTC (1139bp)

3) Usuv3167F TTGGAGTGATGGCGTTGTTG / Usuv4600R TTGCGTACTTGACAGTGAGC (1433bp)

(for these pairs primer the T° annealing is 60°C)

(*) from (Cadar *et al.* 2014)

(**) from (Bakonyi *et al.* 2004)

Nucleotide position are according to the "Vienna2001" reference strain USUV genome sequence (AY453411) (Bakonyi *et al.* 2004). (See Table **S2** in the supplemental material).

Therefore, with this protocol the whole genome of USUV could be sequenced from only 10 PCR reactions, which were far less in comparison to others protocols available in bibliography (Cadar *et al.* 2014; Bakonyi *et al.* 2004).

Subsequently, the PCR products were all gel purified and cloned. Gel purification electrophoresis was carried out in a 1% Tris acetate-EDTA-agarose gel at 80 V for 60'.

The gel was stained with Gel Star^{TM} Nucleic Acid Gel Stain, 10.000X concentrate in DMSO (LONZA Rockland, ME USA).

Then, the band with the molecular size expected, was completely removed from the gel and purified with the commercial Kit Zymoclean Gel DNA Recovery Kit (200 Preps) (ZYMO RESEARCH, USA) according to the instructions of the manufacturer.

After gel purification, the PCR products were all cloned using the commercial kit "TOPO TA Cloning Kit for sequencing" (Invitrogen) that included "One Shot TOP10 Chemically Competent *Escherichia coli* cells" (Invitrogen) and the plasmid vector "pCR-4-TOPO", according to the instructions of the manufacturer.

Plasmid DNA was extracted from positive colonies with "PureLink Quick Plasmid MiniPrep Kit" (Invitrogen) according to the instructions of the manufacturer.

To check if the correct insert was present, we made a specific enzymatic cleavage (EcoR1 enzyme) on the plasmid with the following protocol:

Mix (20 ul)

EcoR1enzyme 0.3 ul

10x Buffer 3 ul

100x BSA 0.3 ul

H_2O milliQ (depending on the sample concentration)

Plasmid DNA (depending on the sample concentration*)

*For each reaction needs average 600 ng of plasmid DNA;

Incubation was performed at 37°C for 2 hours. Lastly, we checked the band expected through a gel electrophoresis carried out in a 1% Tris acetate-EDTA-agarose gel at 80 V for 60 min.

Chapter 4

Results

4.1 Surveillance plan on birds and mosquitoes

In relation to the surveillance plan, during the year 2015, 5,345 adult mosquitoes representing 17 different species were collected (**table 4.1**). The most represented species were *O. caspius* with 1,454 specimen(27.2%); *C. pipiens* 994 (18.6%); *C. theileri* 764 (14.3%) and *O. detritus* 732 (13.7%).

SPECIES	TOTAL (%)
Ochlerotatus caspius	1454 (27.20)
Culex pipiens	994 (18.59)
Culex theileri	764 (14.29)
Ochlerotatus detritus	732 (13.69)
Culiseta annulata	580 (10.85)
Culex spp.	259 (4.84)
Anopheles labranchiae	171 (3.19)
Anopheles algeriensis	155 (2.89)
Aedes spp.	86 (1.60)
Culiseta longiareolata	46 (0.86)
Ochlerotatus mariae	28 (0.52)
Aedes vexans	21 (0.39)
Aedes albopictus	20 (0.37)
Culiseta subochrea	9 (0.16)
Culiseta spp.	9 (0.16)
Culex hortensis	5 (0.09)
Coquillettidia richiardii	5 (0.09)
Anopheles spp.	4 (0.07)
Aedes vittatus	1 (0.01)
Culex impudicus	1 (0.01)
Orthopodomyia pulchripalpis	1 (0.01)

Table 4.1 Species of mosquitoes caught during 2015 (from Rossi *et al.* 2016).

The seasonal abundance (**table 4.2**) peak of *O. caspius* and *O. detritus* were recorded in October with a maximum of 859 and 324 individuals, respectively while *C. pipiens* and *C. theileri* showed a peak in July with 208 and 577 adults, respectively.

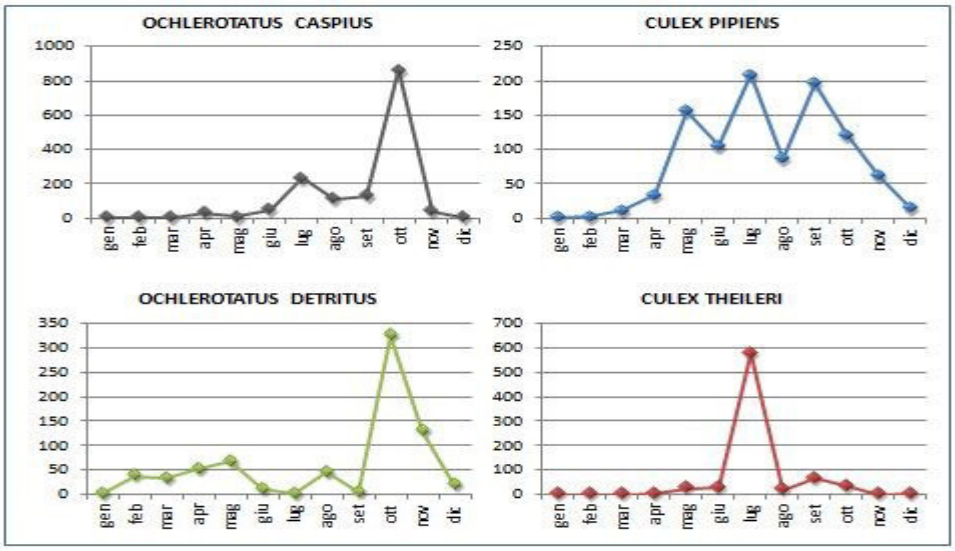

Table 4.2 Seasonal trends spp. *Culex* and *Ochlerotatus* (from Rossi *et al.* 2016).

The *Ochlerotatus* taxon was considered as an *Aedes* sub-genus (Savage *et al.* 2004).

These results confirm the gradual adaptation of the mosquito belonging to *Aedes* genus to our climate and environment which could be a very dangerous future health threat because the *Aedes* mosquito is the main vector for *Zika* virus (ZIKV).

During the year 2015, we also observed the over-wintering of mosquitoes in Sardinia, probably due to a drought condition.

Overall, 1,004 pools were sorted and tested for USUV and it was detected in 4 pools consisting of not-engorged females of *C. pipiens* captured from August to October in Siniscola (ID 54860/1), Oschiri (ID 59265), Alghero (ID 62059/4) and Olbia (ID 71253/2) municipalities.

During 2015, 525 birds were collected within the specific wildlife population control programs and USUV was detected in a pool (spleen, heart, and kidney) of owl (*Athene noctua*) in Olbia (ID 81088) municipality.

In total we found eight isolates of USUV in Sardinia (**table 4.3**): five in 2015 which have been already described above, two isolates of USUV found in 2014 in Badesi (ID 67279/1) and San Teodoro (ID 80158) municipalities and finally, the first isolate of USUV found in Sardinia in 2013 in Sassari (ID 91418) municipality.

ID sample	sample	year	sample screened 2013-15
ID 91418	mosquito	2013	3124
ID 67279/ 1	**mosquito**	**2014**	**3124**
ID 80158	mosquito	2014	3124
ID 54860/ 1	**mosquito**	**2015**	**3124**
ID 59265	mosquito	2015	3124
ID 62059/ 4	**mosquito**	**2015**	**3124**
ID 71253/ 2	mosquito	2015	3124
ID 81088	**owl**	**2015**	**1835**

Table 4.3 Positive samples for USUV found in Sardinia from 2013 to 2015.

All isolates were detected and confirmed by specific Real Time RT-PCR for USUV (Cavrini et al. 2011). However only the strains 91418 and 62059/4 were also confirmed with data sequence.

4.2 Phylogenetic analysis

We analized all the isolates found (**fig. 4.1**) but surprisingly we obtained only the partial sequence of *NS5* and *E* genes of two isolates, 91418 (2013) and 62059/4 (2015) and only by using the primers that were designed by us.

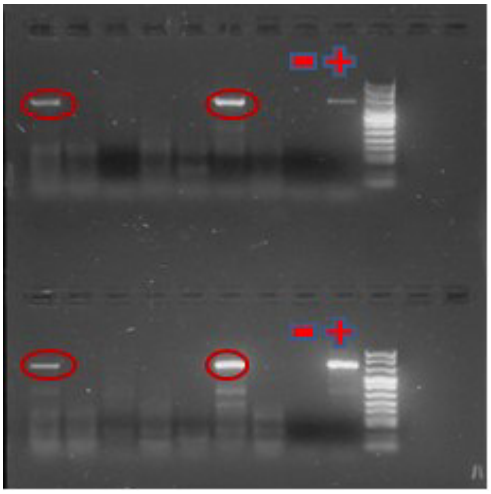

Fig. 4.1 Photo gel electrophoresis for phylogenetic analysis; the top row in the gel represents the gene *E* while the row below represents the gene *NS5*. We used Marker8 (Roche).

Unfortunately, we did not achieve any result with the use of the primers developed by Sanchez-Seco MP *et al.* 2005 and Kuno *et al.* 1998.

Following these results, we proceeded only with the analysis of the isolates 91418 and 62059/4.

In order to see if they were different, we aligned the sequence of the two isolates with MUSCLE software (available at http://www.ebi.ac.uk/Tools/msa/muscle/) through preliminary data sequence, and the percentage of identity in both genes was of 100%. We gave to this type of sequence the temporary name of "USUTUSARD2013-2015".

Afterwards we compared these results with other sequences of USUV present in the database. The phylogenetic tree was obtained by MEGA software (Tamura *et al.* 2013) using the maximum parsimony in the analysis of taxa, simply because this is more suitable for much preserved sequences such as USUV genome.

In preliminary analysis, the gene *E* (**fig. 4.2**) did not prove to be more informative globally but it distinguished well between Italian strains.

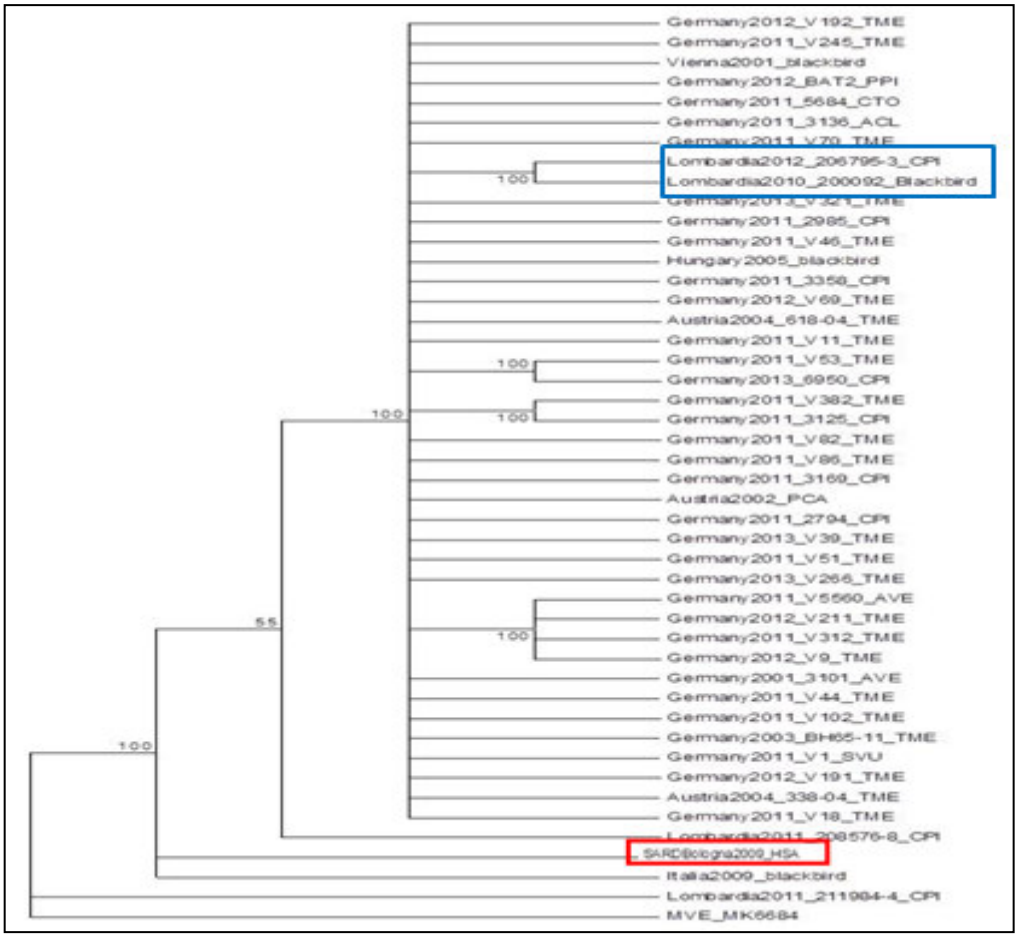

Fig. 4.2 Provisional phylogenetic tree of gene *E* USUV.

Instead, the gene *NS5* was much more informative globally, for this reason we decided to use it for the phylogenetic analysis of USUV. In addition, in order to differentiate better

between the isolates 91418 and 62059/4 we decided to extend the sequence to investigate within the *NS5* gene from (8885-9597 nt) to (8885-10398 nt).

Percent Identity Matrix - created by Clustal2.1

1: 62059	100.00	99.46
2: 91418	99.46	100.00

In this way, we were able to discriminate between our strains and we designed them respectively in strain "**91418_Sassari2013**" and strain "**62059_Sardegna2015**".

Subsequently, we compared them with all USUV strains available in the GenBank from African and European origin using MEGA6 software (Tamura *et al.* 2013) to be able to obtain the phylogenetic tree of *NS5* gene (**fig. 4.3**).

The phylogenetic tree shows that Sardinian strains are closely related to Italian strains, in particular with strain "Bologna2009". This was an extremely interesting discovery because "Bologna2009" has been the first strain isolated from a human patient presenting with neurological symptoms (Gaibani *et al.* 2009).

However, Sardinian isolates show some unique molecular properties in comparison to all Italian strains, like the deletions in 3'-UTR which, until now have not been detected in Italy.

The phylogenetic analysis of the European strains demonstrated that they can be divided in 3 major groups defined by location of sampling: German group, Austrian group and Italian group.

On the other hand, Spanish strains are linked with African strains as well as strains "Holland2016" and "Bonn2014". These strains probably belong to the third recent

independent introduction (Engel *et al.* 2016) in Western Europe (Spain) of USUV via migratory birds.

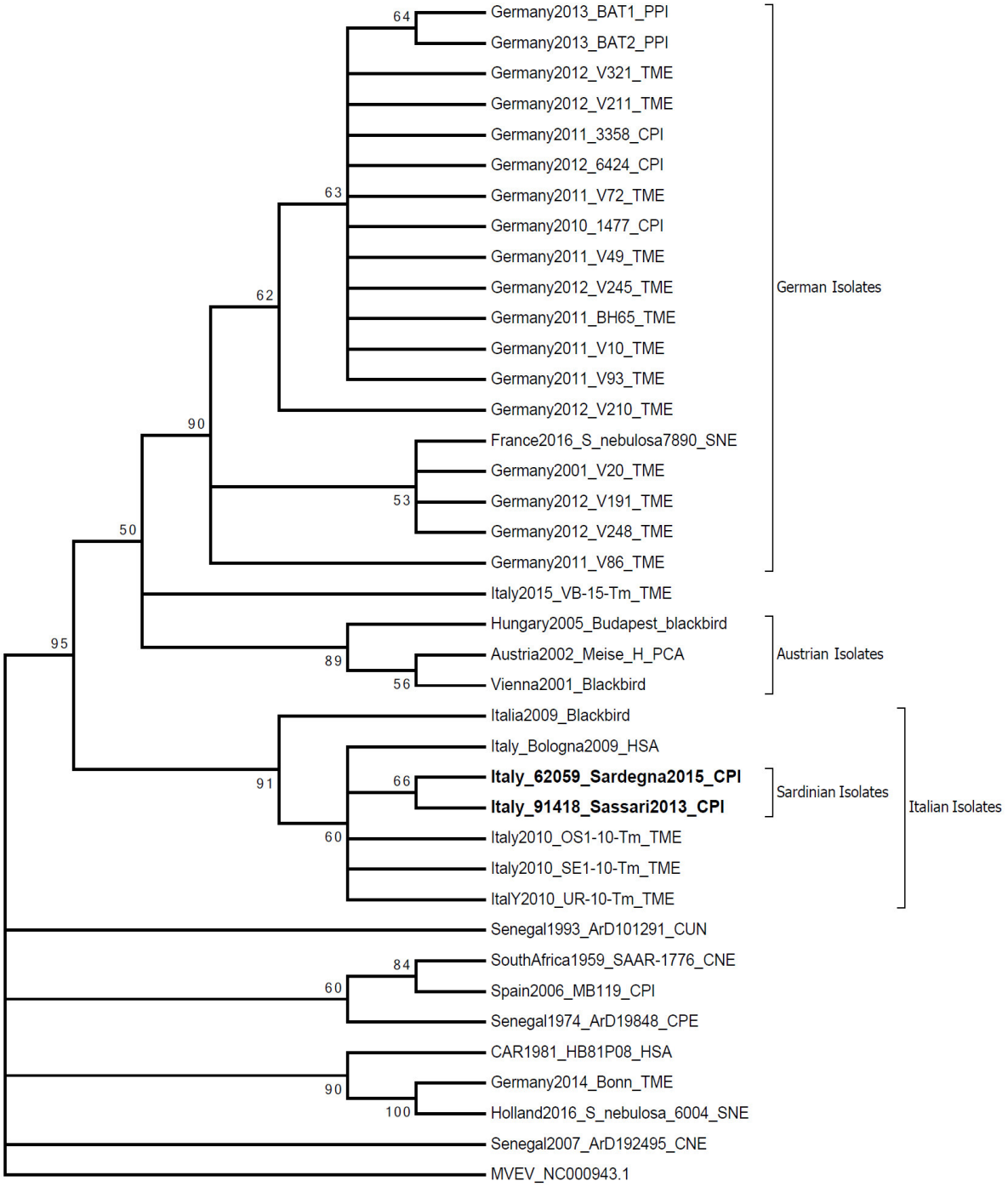

Fig. 4.3 Evolutionary relationships among USUV strains based on *NS5* gene.

4.3 Whole genome sequencing and molecular characterization

This protocol allows to sequence the whole genome of USUV with a smaller number of PCR reactions, specifically in only 10 PCR reactions, much less in comparison to others protocols available in bibliography (Cadar *et al.* 2014; Bakonyi *et al.* 2004).

The PCR reactions functioned well but there were a lot of unspecific band (**fig. 4.4**) because pool of mosquitoes are a very complex matrix. In fact, there are different type of "mosquito-only flavivirus" that maybe can cross-react between them. (Calzolari *et al.* 2012; Grisenti *et al.* 2015; Roiz *et al.* 2012; Vàzquez *et al.* 2012).

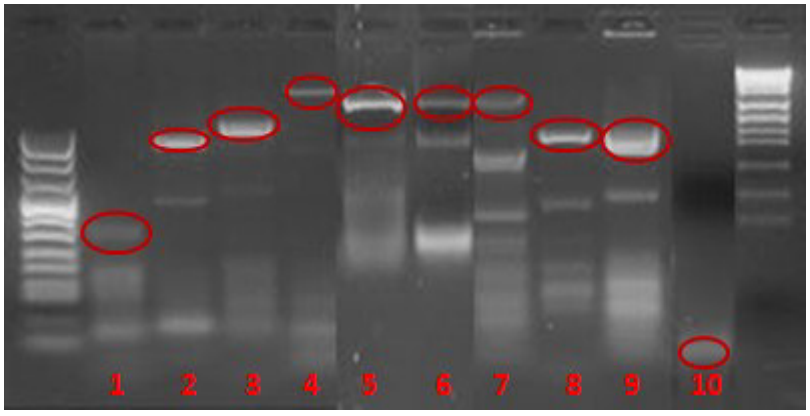

Fig. 4.4 Gel electrophoresis for all PCR reactions to amplify the entire genome of USUV. Isolates 91418 and 62059/4 gave the same results except for the reaction 10.

We used Marker8 (Roche) on the left and Marker7 (Roche) on the right.

In relation to the 3'-terminal region, we had many difficulties in obtaining the expected amplification. For the isolate 91418 we obtained a band at 190 bp (but we expected a band at 420 bp) with the PCR reaction ADF/ 11066Rdeg. For the isolate 62059 we obtained two

bands at 190 bp and 320 bp (but we expected a band at 420 bp) with the PCR reaction ADF/ 11014R but after cloning and sequencing unfortunately they turned out to be unspecific amplification.

The PCR products have been all gel purified and cloned successfully (**fig.4.5**).

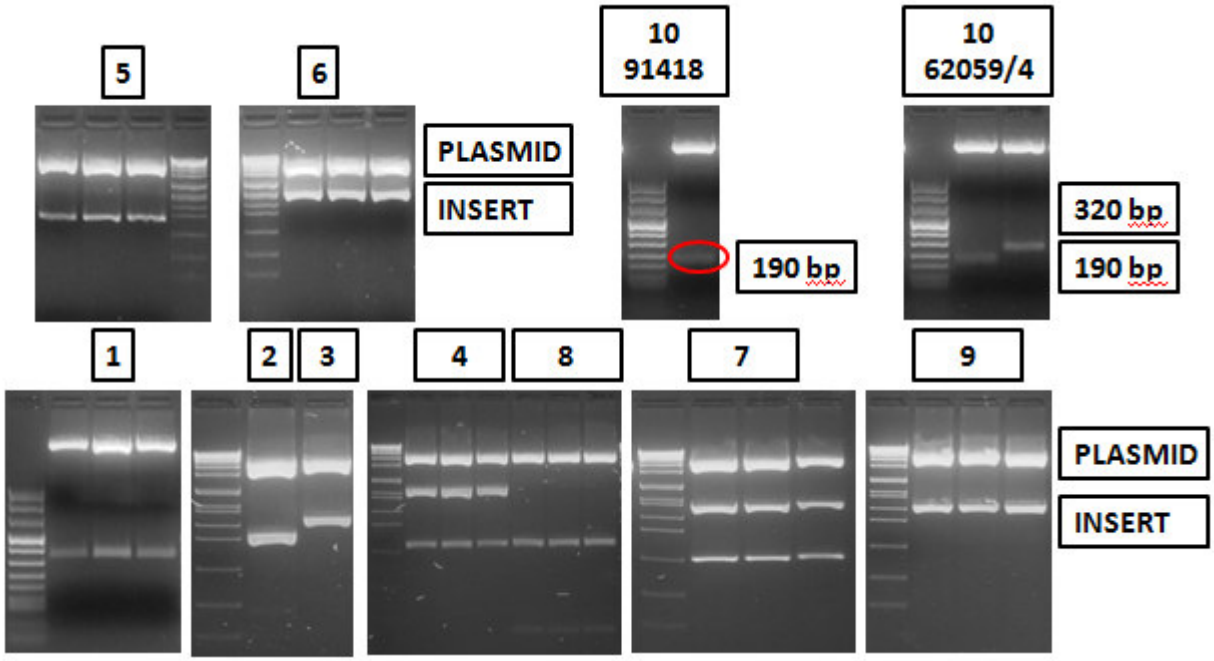

Fig. 4.5 Gel electrophoresis to check if there were the correct inserts. Isolates 91418 and 62059/4 gave the same results except for the reaction 10. We used Marker8 and Marker7 (Roche).

Therefore, we tried again to use the previous primer combinations (pairs primer already described before) but the cDNA was made with "random hexamers" (Roche) rather than with a specific primer for USUV (11066Rdeg).

In addition, we tried to use a reverse primer (11027R) in a slight previous of the theoretical end of the viral genome.

We achieved amplification (**fig.4.6**) only with the pair primer 10746F/ 11027R (band expected at 220 bp) and only in the isolate 62059/4 (**B**). Unfortunately, we found no valid results for the isolate 91418 (**A**).

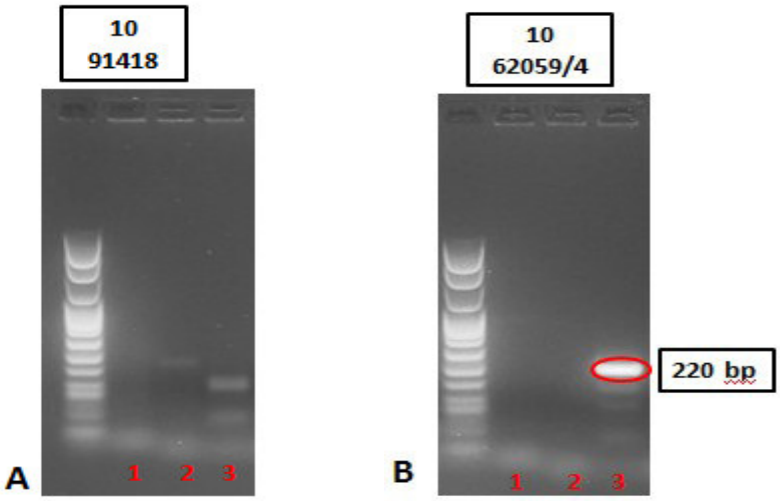

Fig.4.6 The following pairs primer were used: (**1**) ADF/ 11066Rdeg; (**2**) ADF/11014R; (**3**) 10746F/ 11027R; We used Marker8 (Roche). After sequencing confirmed to be USUV.

This particular difficulty to amplify the 3'-terminal of viral genome can be explained by the fact that some USUV strains (in particular in the African lineages) have typically high variable size (short or large deletion). Therefore we assume that our isolates presented a long or short deletion.

BMR GENOMICS Company carried out the sequencing of plasmids and PCR products.

FinchTV software version 1.4.0 (GEOSPIZA, Inc.) (Available at www.geospiza.com/finchtv) analyzed and edited the chromatogram of each sequence.

The nucleotide sequences were aligned using MUSCLE software (available at http://www.ebi.ac.uk/Tools/msa/muscle/) and confirmed by BLAST software (available at https://blast.ncbi.nlm.nih.gov/Blast).

The 91418 USUV isolate complete genome sequence was designated "**91418_Sassari2013**" while the 62059/4 USUV isolate complete genome sequence was designated "**62059_Sardegna2015**".

After obtaining the complete genome sequences, we started the molecular characterization on our viral strains of USUV.

Isolate 91418_Sassari2013

The genome length for the isolate 91418_Sassari2013 is of 10823 nt and contains one large open reading frame (ORF) comprising nucleotides (nt) 97 to 10401 that encodes a unique polyprotein precursor of 3424 amino acid (aa).

This strain is characterized for having a putative large deletion in the 3'-UTR.

Through a comparison of the entire genome nucleotide sequence between our isolates, the Percent Identity Matrix created by Clustal2.1 is:

1: 91418_Sassari2013 100.00 99.43
2: 62059_Sardegna2015 99.43 100.00

After this, we used BLAST software (https://blast.ncbi.nlm.nih.gov/Blast) to estimate the degree of identity among the strain 91418_Sassari2013 and all the strains of USUV available in the GenBank at nucleotide level.

This analysis showed a Percent Identity Matrix of 99% with all USUV strains except African strains: "ArD101291" KC754956.1 ; "HB81P08_CAR_1981" KC754955.1 ; "ArD192495" KC754957.1 ; "ArD19848" KC754954.1 and "SAAR-1776_South Africa" AY453412.1 (98-97%) and the following European strains: "S.nebulosa-6004/NL/2016" KY128482.1 (97%) and "Bonn" KM659877.1 (97%).

This is closely related with the Italian strains of USUV, in particular with:

"UR-10-Tm_2015" KX555624.1 ; "Bologna2009" HM569263.1 ; "SE1-10-Tm_2010" KX555626.1.

Usually the accumulation of mutations in *Arbovirus* is given by the transmission and infection modes as effect of alternation between the arthropod vector and avian or mammal hosts (Holmes EC 2003).

Regarding the UTRs, which is extremely important in *Flavivirus*, we analyzed the complete 5'-UTR sequence of this strain that is 96 nt long. Its sequence was closely related with all European strains of USUV and we have not found any unique mutation.

Comparing the complete 5'-UTR nucleotide sequence between our isolates, the Percent Identity Matrix created by Clustal2.1:

1: 91418_Sassari2013 100.00 96.88
2: 62059_Sardegna2015 96.88 100.00

We have not found any particular mutation in this genomic region.

The 3'-UTR sequence in USUV is typically high and variable in size. In the isolate 91418_Sassari2013 is 425 nt long such as many African strains of USUV (**fig. 4.7**).

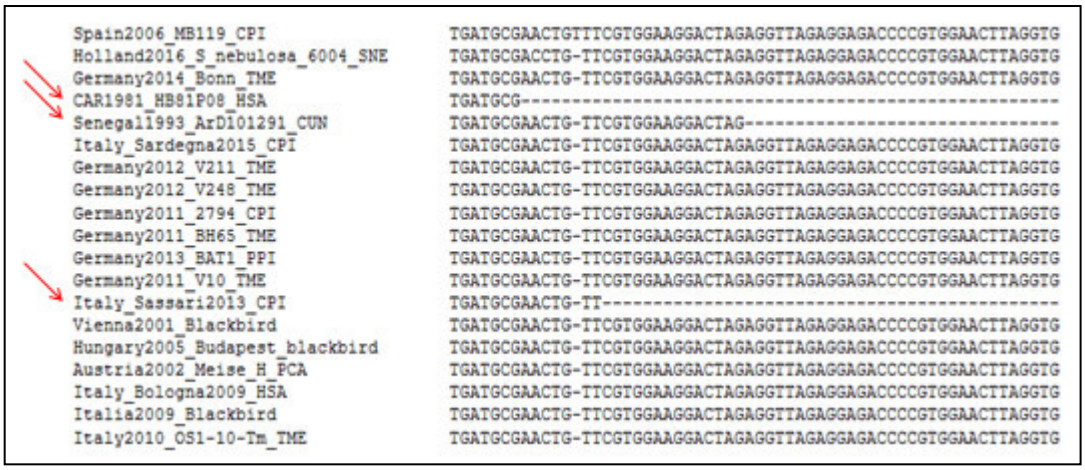

Fig. 4.7 Alignment of several strains of USUV of 3'-UTR.

The 3'-UTR sequence of this strain was aligned with several sequences of USUV strains (strains list described below) available in the GenBank to find unique or specific mutations. We found a specific mutation in position 5 T→C related only with our strains (62059_Sardegna2015) and the strains "Berlin2015" and "Spain_MB119_2006".

List USUV strains used to investigate in the 3'-UTR:

1. Usutu virus isolate ArD101291, complete genome KC754956.1
2. Usutu virus isolate HB81P08, complete genome KC754955.1
3. Usutu virus strain Spain MB119/06, complete genome KF573410.1
4. Usutu virus clone Berlin2015_ME/2015/ED-A, complete genome KU664608.1
5. Usutu virus isolate S.nebulosa-6004/NL/2016, complete genome KY128482.1
6. Usutu virus strain Bonn, complete genome KM659877.1
7. Usutu virus strain SAAR-1776 from South Africa, complete genomeAY453412.1
8. Usutu virus strain V10, complete genome KJ438760.1
9. Usutu virus gene for polyprotein, genomic RNA, isolate BH65/11-02-03 HE599647.1
10. Usutu virus strain OS1-10-Tm polyprotein gene, complete cds KX555628.1
11. Usutu virus strain V211, complete genome KJ438764.1
12. Usutu virus strain V248, complete genomeKJ438774.1

13. Usutu virus isolate BAT1USUTU-BNI, complete genomeKJ859682.1
14. Usutu virus strain 2794, complete genome KJ438767.1
15. Usutu virus strain Meise H polyprotein gene, complete cds JQ219843.1
16. Usutu virus strain Vienna 2001 from Austria, complete genomeAY453411.1
17. Usutu virus isolate Budapest, complete genome EF206350.1
18. Usutu virus strain Italia 2009, complete genomeJF266698.1
19. Usutu virus strain Bologna 2009, complete genome HM569263.1
20. Usutu virus isolate ArB1803, complete genome KC754958.1

We obtained the amino acid sequence of our isolates by using EMBOSS software (available at http://www.ebi.ac.uk/Tools/emboss/), and we compared them using Clustal2.1.

Percent Identity Matrix:

1: 91418_Sassari2013 100.00 99.16
2: 62059_Sardegna2015 99.16 100.00

After that, we used BLAST software (https://blast.ncbi.nlm.nih.gov/Blast) to estimate the degree of identity at amino acid level among the strain 91418_Sassari2013 and all the strains of USUV available in database.

This showed a Percent Identity Matrix of 99% with all USUV strains except:

"Berlin2015" API68248.1 (98%) ; "Spain MB119/06" AHA57377.1 (98%); "ArB1803" AGP50649.1 (95%).

This is closely related with the Italian strains of USUV, in particular with:

"Bologna 2009" AEF13245.1 ; "SE-10-Tm" APC23728.1 ; "SE1-10-Tm" APC23729.1.

We found the presence of twelve unique mutations, N32S (M); F218V (E); L75P and K189E (NS1); A131G (NS2a); T64A (NS2b); E588G (NS3); T70I and L189M* (*related with 62059_Sardegna2015) (NS4b); K402R; E560D and E738G (NS5).

The analysis of the genes *E* and *NS5* (involved in increase of virulence) and the complete genome sequence of the strain 91418_Sassari2013 revealed several geography - and host - specific mutation.

The analysis was made by using the work of Engel *et al.* 2016 as a landmark.

In relation to the geography-specific mutations, we detected the specific mutation A120V (C) (also present in some Italian strains) that is fixed in all members of African lineages but lacks the mutations G320S (E); P376S (E) and A274T (NS5) are specific for African lineages.

There is the mutation A168T (E) specific for European lineages but lacks the mutation D67Y (E) specific for European lineages.

Concerning the country- and host-specific mutations, we found the presence of the mutation R195G (E) associated to Italian strains and mosquitoes hosts. On the other hand there was no presence of the mutation A161V (E) associated with African strains and mosquitoes. In addition we did not find the mutation I120N (M), specific for Germany and birds hosts and the mutations A91V (NS2a) and L46F (NS3) specific for bats.

Very important, are present the pathogenic mutations G302S (E) and D896E (NS5) related with increase of virulence in comparison with others *Flavivirus* (Sànchez *et al.* 2005; Gould *et al.* 2009; Chambers *et al.* 1998; Botha *et al.* 2008; McMinn PC 1997; Chin *et al.* 2007).

Isolate 62059_Sardegna2015

The genome length for the isolate 62059_Sardegna2015 is of 11009 nt that contains one large open reading frame (ORF) comprising nucleotides (nt) 97 to 10401 that encodes a unique polyprotein precursor of 3424 amino acid (aa).

The Percent Identity Matrix between the strain 62059_Sardegna2015 and 91418_Sassari2013 has been described previously.

Consequently, we used BLAST software (https://blast.ncbi.nlm.nih.gov/Blast) to estimate the degree of identity among the strain 62059_Sardegna2015 and all the strains of USUV available in GenBank at nucleotide level.

This showed a Percent Identity Matrix of 99% with all USUV strains except African strains: "ArD101291" KC754956.1 ; "HB81P08_CAR_1981" KC754955.1 ; "ArD192495" KC754957.1 ; "ArD19848" KC754954.1 and "SAAR-1776_South Africa" AY453412.1 (98-97%) and the following European strains: "S.nebulosa-6004/NL/2016" KY128482.1 (97%) and "Bonn" KM659877.1 (97%);

The strain 62059_Sardegna2015 is closely related with the Italian strains of USUV, in particular with:

"UR-10-Tm_2015" KX555624.1 ; "Bologna2009" HM569263.1 ; "SE1-10-Tm_2010" KX555626.1. These were the same results of the strain 91418_Sassari2013.

In this strain, the 5'-UTR is long 96 nt and its sequence is closely related with all European strains of USUV. However, more importantly, we have found the specific mutation G→T in position 8 which, until now, has been detected only in the strain "Bologna2009" (Gaibani *et al.* 2013).

The 3'-UTR in this strain is long 611 nt and it was aligned with several sequences of USUV strains (strains list described previously), available in GenBank, to find unique or specific mutations. We found one specific mutation in position 5 T→C (already described before) and three unique mutations in position 124 T→C ; 204 G→A and 253 G→T.

Within the 3'-UTR it is present a short deletion motif of 16 nucleotides (**fig.4.8**) denominated "deleted motif 4" (DM4) (Engel *et al.* 2016) located in the stem loop SL-5 region (**fig. 4.9**) exactly as in the strain "HB81P08_CAR_1981". This was an extremely interesting discovery because this strain was isolated from a human patient presenting symptoms typical of USUV infection (Institut Pasteur de Dakar 1984; Nikolay *et al.* 2013).

Fig. 4.8 Alignment of several strains of USUV of 3'-UTR; There is a short deletion motif of 16 nucleotides exactly as in the strain "HB81P08_CAR_1981".

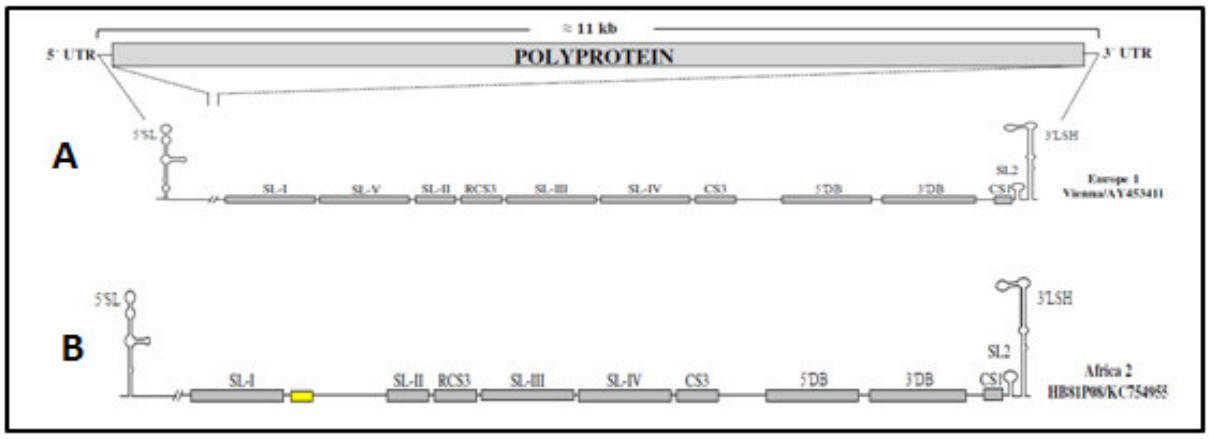

Fig. 4.9 (A) Schematic representation of the patterns of RNA structures that occurred in the 5′ and 3′-UTR of USUV. Reference model strain is "Vienna2001" (AY453411) (from Engel *et al.* 2016).

(B) Schematic representation of 16 nucleotides deletion in the stem loop SL-5 region.

In relation to the amino acid sequence, we used BLAST software (https://blast.ncbi.nlm.nih.gov/Blast) to estimate the degree of identity at amino acid level among the strain 62059_Sardegna2015 and all the strains of USUV available in the database.

The result showed a Percent Identity Matrix of 99% with all USUV strains except:

"Berlin2015" API68248.1 (98%) ; "Spain MB119/06" AHA57377.1 (98%); "ArB1803" AGP50649.1 (94%).

This is closely related with the Italian strains of USUV, in particular with:

"Bologna 2009" AEF13245.1 ; "SE-10-Tm" APC23728.1 ; "SE1-10-Tm" APC23729.1.

Are present nineteen unique mutations, S87P (M); K336E (E); I183T (NS1); Y57H and F123L (NS2a); R74C (NS2b); D211G and R619G (NS3); V158A ; L171P ; I179T and L189M* (*related with 91418_Sassari2013) (NS4b); R29G ; R286G ; E313G ; T350A ; H499R and W706G (NS5).

In particular the mutation R619G (NS3) changes the cleavage site of the gene junction "NS3-NS4a". Usually these are highly conserved but slight differences have been observed in all studied USUV ORFs (Engel *et al.* 2016). If these changes affect the virus assembly or RNA replication still remains to be clarified.

The analysis of the gene *E*, *NS5* and complete genome sequence of the strain 62059_Sardegna2015 revealed several geography and host-specific mutation.

Even for this strain the analysis was made using the work of Engel *et al.* 2016 as a landmark.

The geography and host-specific mutations gave the same results of the strain 91418_Sassari2013. However we found also a unique specific non synonymous mutation K336E (E) within the "Domain III" (DIII) of the E protein, which was far more interesting because DIII represents a receptor binding domain and a major determinant of virus cellular tropism (Chin *et al.* 2007).

Chapter 5

Discussion

The first achievement of this research study was to find for the first time, through the monitoring on mosquitoes and birds, the evidence that USUV is circulating in Sardinia.

Moreover, the surveillance system confirms *C. pipiens* as the main vector of the virus in Sardinia, like in the rest of Italy, and its primary role in the circulation of USUV in the surveyed area. In addition, all the *C. pipiens*-positive pools were found only in the North Sardinia.

The results of entomological surveillance confirm also the gradual adaptation of the mosquito belonging to *Aedes* genus (and *Ochlerotatus*, *Aedes* sub-genus) to our climate and environment. This is an extremely dangerous fact for future health threat because *Aedes* mosquito is the main vector known for *Zika* virus (ZIKV).

It is important to also note that only one bird tested positive for USUV in passive surveillance and no one in active surveillance.

Regarding the fact that some positive samples of USUV were found by us (67279/1; 80158; 54860/1; 59265; 71253/2 and 81088) and the difficulty to confirm the positivity even by traditional PCR and sequencing, we think that these isolates may have a high genetic variability in comparison to the others strains of USUV. This is the reason why we cannot amplify through traditional PCR, or as an alternative maybe, these samples of USUV are false positive USUV, due to the wide variety of "mosquito-only flavivirus" constitutionally present in mosquitoes. In addition, *Flavivirus* typically have very similar and well preserved

genomic sequences, which can give a cross-reactivity between them (Gaibani *et al.* 2010; Calzolari *et al.* 2012; Grisenti *et al.* 2015; Roiz *et al.* 2012; Vàzquez *et al.* 2012).

The last hypothesis is that the samples are degraded. However, these are hypotheses that have to be verified in the future using more advanced methods like Next Generation Sequencing (NGS).

In relation to the positive sample also confirmed in traditional PCR, we determined the full-length nucleotide sequence of the isolates 91418 and 62059/4 that designed respectively strain "**91418_Sassari2013**" and strain "**62059_Sardegna2015**" through the technique of "Primer-Walking", with a new protocol developed by us to allow to overcome the problem of the small amount of sample, which is typical with mosquitoes pool sample.

Subsequently, we processed these samples for phylogenetic analysis and compared them with others sequences of USUV present in the database. This was done to investigate mutations associated with increased virulence or associated with geography- or host-adaptation.

The local strains are closely related to the Italian strains and in particular with "Bologna2009". This is particularly interesting because "Bologna2009" has been the first strain isolate from a human patient with neurological symptoms (Gaibani *et al.* 2009).However, it is noted that they have their own molecular characteristics in comparison to Italian strains, like, for example, the deletions in 3'-UTR, which until now have not been detected in Italian strains.

Phylogenetic results likely confirm the theory that the genetic diversity of USUV is shaped primarily by *in situ* evolution (enzootic maintenance) (Engel *et al.* 2016), due to the fact that

USUV circulates in multiple areas that are separated from each other by geographic barriers such as climate, vegetation, different host species, and other unknown ecological conditions. It is important to stress the fact that Sardinia is an island whose environment is protected against external influence.

It is significant to underline that the strains 91418_Sassari2013 and 62059_Sardegna2015 are both characterized by having the geography- and host-specific mutation R195G (E) related to Italian strains and mosquito host and the pathogenic mutations G302S (E) and D896E (NS5). This is particularly important because many studies of the closely related flavivirus WNV have shown that substitutions, in virtually equivalent positions in these two genes, were associated with variation in the capacity of WNV to invade the central nervous system (CNS) of laboratory mice under experimental conditions (Sànchez *et al.* 2005; Gould EA and Higgs S 2009; Chambers *et al.* 1998).

In fact, in relation to the pathogenic mutation G302S (E), specific amino acid substitutions, within domain DIII of the E protein, have been implicated as mediators/moderators of virus infectivity, virulence, antigenicity and the capacity to escape from neutralizing antibodies for WNV (Gould EA and Higgs S 2009; Chu *et al.* 2005). Interestingly, similar amino acid substitutions in the E domain (DIII) were found in DENV-2 isolates in Southern-Asia, that were associated with cases of human encephalitis, whether or not they were also associated with classical clinical manifestations of dengue infection (Zang *et al.* 2010). In the strain 62059_Sardegna2015 we found also a unique non synonymous mutation K336E (E) with amino acid charge changes within domain DIII.

The flavivirus NS5 protein encodes the RNA dependent RNA polymerase which is a critical component of the virus replication complex.

With regards to the mutation D896E (NS5), associated with viral replication efficiency and neuro-invasive capacity in certain strains of JEV and WNV (Gaibani *et al.* 2012), we detected, within the NS5 protein, four unique non synonymous mutations R29G; R286G; E313G and T350A in the strain 62059_Sardegna2015 and one unique non synonymous mutation E738G in the strain 91418_Sassari2013. Substitutions in the preserved domain of this polymerase can impact viral replication efficiency via perturbation of the viral replication complex. In fact, a single amino acid charge has been found to influence WNV replication in different hosts (Van Slyke *et al.* 2012).

We also found a putative large deletion in 3'-UTR in the strain 91418_Sassari2013 and a short deletion of 16 nucleotides located in the stem loop SL-5 region in the strain 62059_Sardegna2015 and this might alter these secondary structures and thereby influence virus infectivity. Actually, it has been shown that the variation in this region may have evolved as a function of dengue virus (DENV) transmission and replication in different mosquitoes and nonhuman primate/human host cycles (Shurtleff *et al.* 2001).

The 3'-UTR is important for *Flavivirus* replication and virulence determination, as the formation of secondary structures serve as cis-acting elements during RNA transcription (Hurrelbrink RJ and McMinn PC 2003).

In the strain 62059_Sardegna2015 are also present three unique nucleotide mutations 124 T→C ; 204 G→A ; 253 C→T and previous studies with WNV have demonstrated that single nucleotide substitutions in the 3'-UTR region can affect RNA processing and replication, as well as polyprotein synthesis and maturation during the replication cycle (Turner *et al.* 2004; Davis *et al.* 2007).

In conclusion, we found some significant molecular features in our strains, in particular in the strain 62059_Sardegna2015, most of them associated with the increase of virulence and ability to infect mammals including humans. However further studies will be required to better understand the effects of these strain-specific nucleotide and amino acid substitutions, and in particular comparative pathogenesis studies on different USUV strains using animal models will be essential.

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PhD Thesis in Life Sciences and Biotechnologies Curriculum Microbiology and Immunology University of Sassari
"Characterization and phylogenetic analysis of *Usutu* virus isolates in Sardinia"
PhD student Roberto Bechere

Technical Appendix (**Table S1**)

Primers used for the full-length amplification of *Usutu* virus

1) UsuvF1deg AGWYGTTBGYCTGYGTGAGC / Usuv327R TGCCGTGGTCTTGTTGATGC (327 bp)

2) Usuv232F TTTGTGCTGGCCTTGATGAC / Usuv1246R CGTACGTGTCCTCAGCTCTC (934 bp)

3) Usuv1124F CACGAACCTGGCTGAAGTGA / Usuv2353R TGATCCAGGACATGCCACCG (1229 bp)

4) Usuv2295F GTACATCAGGTCTTTGGAGG / Usuv4693R TGTAACGGCTCATGATACGG (2398 bp)

5) Usuv4578F TGGCTCACTGTCAAGTACGC / Usuv5509R CAATGTAGCCTCGTGCTGCTAT (931 bp)

6) Usuv5443F ACCTCTTTGTGATGGATGAG / Usuv6935R GTTCTCTCTAACATTCCGTA (1492 bp)

7) Usuv6861F GCTGTGTTTCTGATCTGTGT / Usuv8956R TGGCACTGCTCCATTGGTTC (2095 bp)

8) Usuv8885F TAAGAGGAAGGTCAACAGCA / Usuv9994R ACAACAGGAGCCACATCTGA (1109 bp)

9) Usuv9643F* GAGAACGGAGAAGAAAGGGT / Usuv10823R* ACCAGTTCGCATCACCGTCT (1181 bp)

10) UsuvADF* (10646) GAAAGCCCCTCAGAACCGTTTC / Usuv11066Rdeg AGATCCTGTGGTCTWGTYCC(420 bp) or

11) UsuvADF* (10646)GAAAGCCCCTCAGAACCGTTTC / Usuv11014R* AGATCCTGTGKTCTWSYYCMCCAYCAG(420 bp) or

12) Usuv10794F** CAAGCGAACAGACGGTGATG / Usuv11027R* GCGCTCTGTGCCTTGTGGTTGAT (233 bp)

Primers used for closing gap in reactions 4 and 7:

13) Usuv6901F GTGGCTGCCAATGAATACGGAA / Usuv7845R TGGGTGTCCTCCAGTTTTGT (944 bp)

14) Usuv7769F AGAGGCCATCACTGAAGTCG / Usuv8908R CGTTGCTGTTGACCTTCCTC (1139 bp)

15) Usuv3167F TTGGAGTGATGGCGTTGTTG / Usuv4600R TTGCGTACTTGACAGTGAGC (1433 bp)

(*) from Cadar *et al.* 2014

(**) from Bakonyi *et al.* 2004

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CLUSTAL multiple sequence alignment by MUSCLE (3.8)


Spain_MB119/06_2006,            AGTCGTTCGTCTGCGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Dakar_ArD192495,                AGATGTTGGCCTGTGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Senegal_ArD101291_1993          AGATGTTGGCCTGTGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Germania_V45_2011               AGTCGTTCGTCTGCGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Germany_V382_2013               AGTCGTTCGTCTGCGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Vienna_2001                     AGTCGTTCGTCTGCGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Bologna_2009                    AGTCGTTTGTCTGCGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
Italia_2009                     AGTCGTTCGTCTGCGTGAGCTCTACTACTTAGTATTGTTTTTGGAGGATCGTGAGATTAA
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South_Africa_SAAR-1776_2001     AGTCGTTCGTCTGCGTGAGCTCTACTACTTCATATTGGTTTTTGGAGGATCGTGAGATTAA
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Italia_2009                     CACAGTGCCGGCAGTTTCTTTGAGCGTTGATTTTCAATGTCTAAGAAACCAGGAGGGCCC
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South_Africa_SAAR-1776_2001     GCCTTGATGACATTCTTCAAGTTCACCGCGCTTGCCCCGACAAAGGCCTTGCTAGGCCGT
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                                *****  ** ******* ****************  ******************** ***

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Bologna_2009                    CTTTCCAACTTCCAGGGGAAAGTCATGATGACCATCAACGCGACTGACATGGCAGATGTC
Italia_2009                     CTTTCCAACTTCCAGGGGAAAGTCATGATGACCATCAACGCGACTGATATGGCAGACGTC
Dakar_ArD19848_1974             CTTTCCAACTTCCAGGGGAAAGTCATGATGACCATCAACGCGACTGATATGGCAGATGTC
South_Africa_SAAR-1776_2001     CTTTCCAACTTCCAGGGGAAAGTCATGATGACCATCAACGCGACTGATATGGCAGACGTC
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Spain_MB119/06_2006,            ATTGTTGTTCCCATGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Dakar_ArD192495,                ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Senegal_ArD101291_1993          ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Germania_V45_2011               ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Germany_V382_2013               ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Vienna_2001                     ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Bologna_2009                    ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCTATGGATGTCGGG
Italia_2009                     ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
Dakar_ArD19848_1974             ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATCAGAGCCATGGATGTCGGG
South_Africa_SAAR-1776_2001     ATTGTTGTTCCCACGCAACATGGGAAAAACCAGTGCTGGATTAGAGCCATGGATGTCGGG
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Spain_MB119/06_2006,            TACATGTGTGGTGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCA
Dakar_ArD192495,                TACATGTGTGATGATACCATCACTTATGAATGTCCCAAACTGGATGCAGGAAATGACCCA
Senegal_ArD101291_1993          TACATGTGTGATGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCA
Germania_V45_2011               TACATGTGTGATGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCA
Germany_V382_2013               TACATGTGTGATGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCA
Vienna_2001                     TACATGTGTGATGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCA
Bologna_2009                    TACATGTGTGATGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCG
Italia_2009                     TACATGTGTGATGATACCATCACTTATGAATGCCCCAGACTGGATGCAGGAAATGACCCG
Dakar_ArD19848_1974             TATATGTGTGATGATACCATCACCTATGAATGCCCCAAATTGGATGCAGGAAATGACCCA
South_Africa_SAAR-1776_2001     TACATGTGTGATGATACCATCACTTATGAATGCCCCAAACTGGATGCAGGAAATGACCCA
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Spain_MB119/06_2006,            GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTCCACTACGGAAGGTGCACA
Dakar_ArD192495,                GAAGACATTGACTGCTGGTGTGACAAACAACCCATGTATGTCCACTATGGAAGGTGCACA
Senegal_ArD101291_1993          GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTCCACTATGGAAGGTGCACA
Germania_V45_2011               GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTCCACTATGGAAGGTGCACA
Germany_V382_2013               GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTACGTCCACTATGGAAGGTGCACA
Vienna_2001                     GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTTCACTATGGAAGGTGCACA
Bologna_2009                    GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTCCACTATGGAAGGTGCACA
Italia_2009                     GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTCCACTATGGAAGGTGCACA
Dakar_ArD19848_1974             GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTATGTCCACTATGGAAGGTGCACA
South_Africa_SAAR-1776_2001     GAAGACATTGACTGTTGGTGTGACAAACAACCCATGTACGTCCACTACGGAAGGTGCACA
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Spain_MB119/06_2006,            AGAACCAGACATTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
Dakar_ArD192495,                AGAACCAGACATTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAAAGT
Senegal_ArD101291_1993          AGAACCAGACACTCGAAGCGGAGTCGGCGGTCGATTGCGGTGCAGACGCACGGGGAGAGT
Germania_V45_2011               AGAACCAGACACTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
Germany_V382_2013               AGAACCAGACACTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
Vienna_2001                     AGAACCAGACACTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
Bologna_2009                    AGAACCAGACACTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
Italia_2009                     AGAACCAGACACTCGAAGCGGAGTCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
Dakar_ArD19848_1974             AGAACCAGGCATTCGAAGCGGAGCCGGCGGTCGATCGCAGTGCAGACGCACGGGGAGAGT
South_Africa_SAAR-1776_2001     AGAACCAGACATTCGAAGCGGAGCCGGCGGTCGATCGCAGTGCAGACGCACGGAGAGAGT
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Spain_MB119/06_2006,            ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATATCTGATG
Dakar_ArD192495,                ATGCTGGCCAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Senegal_ArD101291_1993          ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Germania_V45_2011               ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Germany_V382_2013               ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Vienna_2001                     ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Bologna_2009                    ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Italia_2009                     ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
Dakar_ArD19848_1974             ATGTTGGCCAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATATCTAATG
South_Africa_SAAR-1776_2001     ATGCTGGCTAACAAGAAGGATGCTTGGCTAGACTCAACCAAGGCTTCGAGATACCTGATG
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Spain_MB119/06_2006,            AAGACTGAAAACTGGATTATCAGGAATCCTGGGTATGCTTTTGTAGCTGTCCTGTTGGGC
Dakar_ArD192495,                AAGACTGAAAATTGGATTATCAGGAATCCTGGGTATGCCTTTGTAGCTGTCCTCTTGGGC
Senegal_ArD101291_1993          AAGACTGAAAATTGGATTATCAGGAATCCTGGGTATGCTTTTGTGGCTGTCCTCTTGGGC
Germania_V45_2011               AAGACTGAGAATTGGATTATCAGGAATCCTGGGTATGCTTTTGTAGCTGTCCTCTTGGGC
Germany_V382_2013               AAGACTGAGAATTGGACTATCAGGAATCCTGGGTATGCTTTTGTAGCTGTCCTCTTGGGC
Vienna_2001                     AAGACTGAGAATTGGATTATCAGGAATCCTGGGTATGCTTTTGTAGCTGTCCTCTTGGGC
Bologna_2009                    AAGACTGAGAATTGGATTATCAGGAATCCTGGGTATGCTTTTGTAGCTGTCCTCTTGGGC
Italia_2009                     AAGACTGAGAATTGGATTATCAGGAATCCTGGGTATGCTTTTGTAGCTGTCCTCTTGGGC
Dakar_ArD19848_1974             AAGACTGAAAATTGGATTATTAGGAATCCTGGGTATGCTTTTGTAGCCGTCCTGTTGGGC
South_Africa_SAAR-1776_2001     AAGACTGAAAACTGGATTATCAGGAATCCTGGGTATGCTTTTGTGGCTGTCCTGTTGGGC
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Spain_MB119/06_2006,            TGGATGCTGGGAGGCAACAATGGACAAAGGGTCGTTTTCGTCGTACTTTTACTCCTTGTG
Dakar_ArD192495,                TGGATGTTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTTCTCTTGCTTCTTGTG
Senegal_ArD101291_1993          TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTTGTCGTTCTCTTACTTCTTGTG
Germania_V45_2011               TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTTCTCTTGCTCCTTGTG
Germany_V382_2013               TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTTCTCTTGCTCCTTGTG
Vienna_2001                     TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTTCTCTTACTTCTTGTG
Bologna_2009                    TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTTCTCTTACTTCTCGTG
Italia_2009                     TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTTCTCTTACTTCTCGTG
Dakar_ArD19848_1974             TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTCTTCGTCATACTCTTACTTCTTGTG
South_Africa_SAAR-1776_2001     TGGATGCTGGGAAGCAACAATGGACAAAGGGTCGTTTTCGTCGTACTCTTACTTCTCGTG
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Spain_MB119/06_2006,            GCGCCTGCTTACAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
Dakar_ArD192495,                GCGCCTGCTTACAGCTTCAACTGCCTTGGCATGAGCAACAGAGACTTCCTTGAGGGAGTC
Senegal_ArD101291_1993          GCGCCTGCTTACAGCTTCAACTGCCTTGGCATGAGCAACAGAGACTTCCTTGAGGGAGTT
Germania_V45_2011               GCGCCTGCTTATAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
Germany_V382_2013               GCGCCTGCTTATAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
Vienna_2001                     GCGCCTGCTTATAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
Bologna_2009                    GCGCCTGCTTATAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
Italia_2009                     GCGCCTGCTTATAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
Dakar_ArD19848_1974             GCGCCAGCTTACAGCTTTAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTT
South_Africa_SAAR-1776_2001     GCGCCTGCTTACAGCTTCAACTGCCTTGGTATGAGCAACAGAGACTTCCTTGAGGGAGTC
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Spain_MB119/06_2006,            TCTGGTGCTACCTGGGTCGACGTGGTTCTGGAAGGCGACAGCTGCATAACCATCATGGCT
Dakar_ArD192495,                TCTGGTGCCACCTGGGTCGACGTGGTTCTGGAAGGTGACAGCTGCATAACCATCATGGCT
Senegal_ArD101291_1993          TCTGGTGCTACCTGGGTCGACGTGGTTTTGGAAGGTGACAGCTGCATAACCATCATGGCC
Germania_V45_2011               TCTGGTGCTACCTGGGTTGACGTGGTTTTGGAAGGTGACAGCTGCATAACCATCATGGCC
Germany_V382_2013               TCTGGTGCTACCTGGGTTGACGTGGTTTTGGAAGGTGACAGCTGCATAACCATCATGGCC
Vienna_2001                     TCTGGTGCTACCTGGGTTGACGTGGTTTTGGAAGGTGACAGCTGCATAACCATCATGGCC
Bologna_2009                    TCTGGTGCTACCTGGGTTGACGTGGTTTTGGAAGGTGACAGCTGCATAACCATCATGGCC
Italia_2009                     TCTGGTGCTACCTGGGTTGACGTGGTTTTGGAAGGTGACAGCTGCATAACCATCATGGCC
Dakar_ArD19848_1974             TCTGGTGCCACCTGGGTCGACGTGGTTCTGGAAGGTGATAGCTGCATAACCATCATGGCT
South_Africa_SAAR-1776_2001     TCTGGTGCTACCTGGGTCGACGTGGTTCTGGAAGGTGACAGCTGCATAACCATCATGGCT
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Spain_MB119/06_2006,            AAGGACAAGCCGACCATTGATATTAAGATGATGGAAACTGAGGCCACGAATCTGGCTGAA
Dakar_ArD192495,                AAGGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAATCTGGCTGAA
Senegal_ArD101291_1993          AAGGACAAGCCGACCATTGACATTAAGATGATGGAGACTGAAGCCACGAATCTGGCTGAA
Germania_V45_2011               AAGGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAACCTGGCTGAA
Germany_V382_2013               AAGGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAACCTGGCTGAA
Vienna_2001                     AAGGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAACCTGGCTGAA
Bologna_2009                    AAGGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAACCTGGCTGAA
Italia_2009                     AAGGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAACCTGGCTGAA
Dakar_ArD19848_1974             AAAGACAAGCCGACCATTGACATTAAGATGATGGAAACTGAAGCCACGAATTTGGCTGAA
South_Africa_SAAR-1776_2001     AAGGATAAGCCGACCATTGACATCAAGATGATGGAAACTGAAGCCACGAATCTGGCTGAA
                                ** ** ************** ** *********** ***** ********  ********

Spain_MB119/06_2006,            GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAATTGTCCA
Dakar_ArD192495,                GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Senegal_ArD101291_1993          GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Germania_V45_2011               GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Germany_V382_2013               GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Vienna_2001                     GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Bologna_2009                    GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Italia_2009                     GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAACTGTCCA
Dakar_ArD19848_1974             GTGAGAAGCTACTGCTATCTAGCTACTGTCTCAGATGTTTCAACTGTCTCCAATTGTCCG
South_Africa_SAAR-1776_2001     GTGAGAAGCTACTGCTATCTAGCCACTGTCTCAGATGTTTCAACTGTCTCCAATTGTCCA
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Spain_MB119/06_2006,            ACGACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAGAGTGGT
Dakar_ArD192495,                ACAACTGGGGAGGCTCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Senegal_ArD101291_1993          ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Germania_V45_2011               ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Germany_V382_2013               ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Vienna_2001                     ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Bologna_2009                    ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Italia_2009                     ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAAAGTGGT
Dakar_ArD19848_1974             ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAGAGTGGT
South_Africa_SAAR-1776_2001     ACAACTGGGGAGGCCCACAATCCTAAGAGAGCTGAGGACACGTACGTGTGCAAGAGTGGC
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Spain_MB119/06_2006,            GTCACTGACAGAGGCTGGGGCAATGGCTGTGGACTATTTGGCAAGGGAAGTATAGACACG
Dakar_ArD192495,                GTCACTGACAGGGGCTGGGGCAATGGCTGTGGACTATTTGGCAAAGGAAGTATAGACACG
Senegal_ArD101291_1993          GTCACTGACAGGGGCTGGGGCAATGGCTGTGGACTATTTGGCAAAGGAAGTATAGACACG
Germania_V45_2011               GTCACTGACAGGGGCTGGGGCAATGGCTGTGGACTATTTGGCAAAGGAAGTATAGACACG
Germany_V382_2013               GTCACTGATAGGGGCTGGGGCAATGGCTGTGGATTATTTGGCAAAGGAAGTATAGACACG
Vienna_2001                     GTCACTGACAGGGGCTGGGGCAATGGCTGTGGACTATTTGGCAAAGGAAGTATAGACACG
Bologna_2009                    GTCACTGACAGGGGCTGGGGCAATGGCTGTGGACTATTTGGCAAAGGAAGTATAGACACG
Italia_2009                     GTCACTGACAGGGGCTGGGGCAATGGCTGTGGACTATTTGGCAAAGGAAGTATAGACACG
Dakar_ArD19848_1974             GTCACTGACAGAGGCTGGGGCAATGGCTGTGGACTATTTGGCAAGGGGAGTATAGACACG
South_Africa_SAAR-1776_2001     GTTACTGACAGAGGCTGGGGCAATGGCTGTGGACTATTTGGCAAGGGAAGTATAGACACG
                                ** ***** ** ********************** ********** ** ************

Spain_MB119/06_2006,            TGTGCCAACTTCACCTGCTCCCTGAAAGCGGTGGGCCGAATGATCCAACCGGAAAATGTT
Dakar_ArD192495,                TGTGCCAACTTCACCTGCTCCCTGAAAGCGGTGGGCCGGATGATCCAACCGGAAAATGTT
Senegal_ArD101291_1993          TGCGCCAACTTCACCTGCTCCCTGAAAGCGACGGGCCGGATGATTCAACCGGAAAATGTT
Germania_V45_2011               TGTGCCAACTTCACCTGCTCCCTGAAAGCGATGGGCCGGATGATCCAACCGGAAAATGTT
Germany_V382_2013               TGTGCCAACTTCACCTGCTCCCTGAAAGCGATGGGCCGGATGATCCAACCGGAAAATGTT
Vienna_2001                     TGTGCCAACTTCACCTGCTCCCTGAAAGCGATGGGCCGGATGATCCAACCGGAAAATGTT
Bologna_2009                    TGTGCCAACTTCACCTGCTCCCTGAAAGCGATGGGCCGGATGATCCAACCGGAAAATGTT
Italia_2009                     TGTGCTAACTTCACCTGCTCCCTGAAAGCGATGGGCCGGATGATCCAACCGGAAAATGTT
Dakar_ArD19848_1974             TGTGCCAACTTCACCTGCTCCCTGAAAGCGGTGGGCCGGATGATCCAACCGGAAAATGTT
South_Africa_SAAR-1776_2001     TGTGCCAACTTCACCTGCTCCCTGAAAGCGGTGGGCCGAATGATCCAACCGGAAAATGTT
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Spain_MB119/06_2006,            AAGTATGAAGTGGGAATCTTCATACATGGCTCCACTAGCTCTGACACTCATGGCAACTAT
Dakar_ArD192495,                AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Senegal_ArD101291_1993          AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Germania_V45_2011               AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Germany_V382_2013               AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Vienna_2001                     AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Bologna_2009                    AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Italia_2009                     AAGTATGAAGTGGGAATCTTCATACATGGTTCTACCAGCTCTGACACTCACGGCAACTAT
Dakar_ArD19848_1974             AAGTATGAAGTGGGAATCTTCATACATGGTTCCACCAGCTCTGATACTCATGGCAACTAT
South_Africa_SAAR-1776_2001     AAGTATGAAGTGGGAATCTTCATACATGGTTCCACCAGCTCTGACACTCATGGCAACTAT
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Spain_MB119/06_2006,            TCTTCACAACTAGGAGTATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Dakar_ArD192495,                TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Senegal_ArD101291_1993          TCTTCACAACTAGGAGCATCGCAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Germania_V45_2011               TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Germany_V382_2013               TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Vienna_2001                     TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Bologna_2009                    TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Italia_2009                     TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
Dakar_ArD19848_1974             TCTTCACAACTAGGAGCATCACAGGCTGGGCGGTTCACCATCACTCCCAATTCCCCAGCC
South_Africa_SAAR-1776_2001     TCTTCACAACTAGGAGCATCACAAGCTGGGCGGTTTACCATCACTCCCAACTCCCCAGCC
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Spain_MB119/06_2006,            ATTACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAATGGG
Dakar_ArD192495,                ATCACTGTGAAGATGGGTGATTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAACGGG
Senegal_ArD101291_1993          ATCACTGTGAAGATGGGTGACTACGGAGAAATATCAGTTGAGTGTGAACCAAGAAACGGG
Germania_V45_2011               ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAACGGG
Germany_V382_2013               ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAACGGG
Vienna_2001                     ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAACGGG
Bologna_2009                    ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCGAGAAACGGG
Italia_2009                     ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCGAGAAACGGG
Dakar_ArD19848_1974             ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAACGGG
South_Africa_SAAR-1776_2001     ATCACTGTGAAGATGGGTGACTATGGAGAAATATCAGTTGAGTGTGAACCAAGAAATGGG
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Spain_MB119/06_2006,            TTGAACACTGAGGCATACTACATCATGTCAGTGGGCACCAAACATTTCCTTGTCCATAGA
Dakar_ArD192495,                TTGAACACTGAGGCATACTACATCATGTCAGTGGGTACCAAACACTTCCTTGTTCATAGA
Senegal_ArD101291_1993          TTGAACACCGAGGCATACTACATCATGTCAGTGGGCACCAAACACTTCCTTGTCCATAGA
Germania_V45_2011               TTGAACACCGAGGCATACTACATCATGTCAGTGGGCACCAAACACTTCCTTGTCCATAGA
Germany_V382_2013               TTGAACACCGAGGCATACTACATCATGTCAGTGGGCACCAAACACTTCCTTGTCCATAGA
Vienna_2001                     TTGAACACCGAGGCATACTACATCATGTCAGTGGGCACCAAACACTTCCTTGTCCATAGA
Bologna_2009                    TTGAACACCGAGGCATACTACATCATGTCAGTGGGCACTAAACACTTCCTTGTCCATAGG
Italia_2009                     TTGAACACCGAGGCATACTACATCATGTCAGTGGGCACTAAACACTTCCTTGTCCATAGA
Dakar_ArD19848_1974             TTGAACACTGAGGCATACTACATCATGTCAGTGGGCACTAAACACTTCCTTGTCCATAGA
South_Africa_SAAR-1776_2001     TTGAACACTGAGGCATACTACATCATGTCAGTGGGCACCAAACATTTCCTCGTCCATAGA
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Spain_MB119/06_2006,            GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCCAGCTCAAATTGGAGAAAT
Dakar_ArD192495,                GAATGGTTTAATGATTTGGCTCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
Senegal_ArD101291_1993          GAATGGTTCAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
Germania_V45_2011               GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
Germany_V382_2013               GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
Vienna_2001                     GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
Bologna_2009                    GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
Italia_2009                     GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAC
Dakar_ArD19848_1974             GAATGGTTTAATGACTTGGCCCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
South_Africa_SAAR-1776_2001     GAATGGTTTAATGACTTGGCTCTCCCATGGACTTCACCAGCTAGCTCAAATTGGAGAAAT
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Spain_MB119/06_2006,            AGAGAAATACTACTAGAGTTCGAAGAACCCCATGCCACAAAGCAATCAGTCGTGGCGCTT
Dakar_ArD192495,                AGAGAGATACTACTAGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Senegal_ArD101291_1993          AGAGAGATACTACTAGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Germania_V45_2011               AGAGAGATACTACTAGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Germany_V382_2013               AGAGAGATACTACTAGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Vienna_2001                     AGAGAGATACTACTAGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Bologna_2009                    AGAGAGATACTACTGGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Italia_2009                     AGAGAGATACTACTGGAGTTCGAAGAGCCCCATGCCACAAAGCAATCAGTTGTGGCGCTT
Dakar_ArD19848_1974             AGAGAGATACTACTAGAGTTCGAAGAACCCCATGCCACAAAGCAATCAGTAGTGGCGCTT
South_Africa_SAAR-1776_2001     AGAGAGATACTACTAGAGTTTGAAGAACCCCATGCCACAAAGCAATCAGTCGTGGCGCTT
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Spain_MB119/06_2006,            GGTTCTCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTATTCCAGTGTCTTTCTCG
Dakar_ArD192495,                GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTTG
Senegal_ArD101291_1993          GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
Germania_V45_2011               GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
Germany_V382_2013               GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
Vienna_2001                     GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
Bologna_2009                    GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
Italia_2009                     GGTTCCCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
Dakar_ArD19848_1974             GGTTCTCAGGAAGGTGCTCTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTTTCG
South_Africa_SAAR-1776_2001     GGTTCTCAGGAAGGTGCTTTGCACCAGGCCTTGGCAGGAGCTGTTCCAGTGTCTTTCTCG
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Spain_MB119/06_2006,            GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAATTGACA
Dakar_ArD192495,                GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGCCGAGTCAAGATGGAAAAGTTGACA
Senegal_ArD101291_1993          GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
Germania_V45_2011               GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
Germany_V382_2013               GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
Vienna_2001                     GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
Bologna_2009                    GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
Italia_2009                     GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
Dakar_ArD19848_1974             GGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGAGTCAAGATGGAAAAGTTGACA
South_Africa_SAAR-1776_2001     AGCAGTGTCAAGCTCACATCTGGTCATCTCAAGTGTCGTGTCAAGATGGAAAAGTTGACA
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Spain_MB119/06_2006,            CTAAAAGGCACCACCTATAGCATGTGTACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Dakar_ArD192495,                TTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Senegal_ArD101291_1993          CTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Germania_V45_2011               CTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Germany_V382_2013               CTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Vienna_2001                     CTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Bologna_2009                    CTAAAAGGCACCACCTACAGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Italia_2009                     CTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
Dakar_ArD19848_1974             CTAAAAGGCACCACCTACGGCATGTGCACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
South_Africa_SAAR-1776_2001     CTAAAAGGCACCACCTACGGCATGTGTACGGAAAAGTTTTCTTTTGCAAAAAATCCGGCT
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Spain_MB119/06_2006,            GACACGGGTCACGGCACTGTGGTTCTTGAACTGCAGTACACGGGATCTGATGGACCTTGC
Dakar_ArD192495,                GACACGGGTCACGGCACTGTGGTACTTGAACTGCAGTACACGGGATCCGATGGACCTTGC
Senegal_ArD101291_1993          GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGACGGACCTTGC
Germania_V45_2011               GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGACGGACCTTGC
Germany_V382_2013               GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGACGGACCTTGC
Vienna_2001                     GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGACGGACCTTGC
Bologna_2009                    GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGACGGACCTTGC
Italia_2009                     GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGACGGACCTTGC
Dakar_ArD19848_1974             GACACGGGTCACGGCACTGTGGTCCTTGAACTGCAGTACACGGGATCTGATGGACCTTGC
South_Africa_SAAR-1776_2001     GACACGGGACACAGCACTGTGGTTCTTGAACTGCAGTACACGGGATCTGATGGACCTTGC
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Spain_MB119/06_2006,            AAAATTCCAATTTCCATCGTAGTATCACTTTCCGATCTCACTCCCATTGGTAGAATGGTT
Dakar_ArD192495,                AAGATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Senegal_ArD101291_1993          AAAATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Germania_V45_2011               AAAATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Germany_V382_2013               AAAATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Vienna_2001                     AAAATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Bologna_2009                    AAAATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Italia_2009                     AAAATCCCAATTTCCATTGTGGCATCACTTTCCGATCTCACCCCCATTGGTAGAATGGTT
Dakar_ArD19848_1974             AAAATCCCAATTTCCATCGTGGCATCACTTTCCGATCTCACTCCCATTGGTAGAATGGTC
South_Africa_SAAR-1776_2001     AAAATTCCAATTTCCATCGTGGCATCACTTTCCGATCTCACTCCCATTGGCAGAATGGTT
                                ** ** *********** ** * ****************** ******** ********

Spain_MB119/06_2006,            ACAGCAAACCCCTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGCTGGTTGAGATGGAA
Dakar_ArD192495,                ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGCTGGTTGAGATGGAA
Senegal_ArD101291_1993          ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGTTGGTTGAGATGGAA
Germania_V45_2011               ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGTTGGTTGAGATGGAA
Germany_V382_2013               ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGTTGGTTGAGATGGAA
Vienna_2001                     ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGTTGGTTGAGATGGAA
Bologna_2009                    ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGTTGGTTGAGATGGAA
Italia_2009                     ACAGCAAACCCTTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGTTAGTTGAGATGGAA
Dakar_ArD19848_1974             ACAGCAAACCCCTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGCTGGTTGAGATGGAA
South_Africa_SAAR-1776_2001     ACAGCAAACCCCTATGTGGCTTCATCCGAAGCCAACGCGAAAGTGCTGGTTGAGATGGAA
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Spain_MB119/06_2006,            CCACCATTTGGAGATTCATACATTGTGGTTGGAAGAGGGGACAAGCAGATAAACCATCAC
Dakar_ArD192495,                CCACCATTTGGAGATTCATACATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAT
Senegal_ArD101291_1993          TCACCATTTGGAGATTCATACATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAC
Germania_V45_2011               CCACCATTTGGAGATTCATATATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAC
Germany_V382_2013               CCACCATTTGGAGATTCATATATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAC
Vienna_2001                     CCACCATTTGGAGATTCATACATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAC
Bologna_2009                    CCACCATTTGGAGACTCATACATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAC
Italia_2009                     CCACCATTTGGAGATTCATACATTGTGGTTGGAAGAGGGGATAAGCAGATAAACCATCAC
Dakar_ArD19848_1974             TCACCTTTCGGAGATTCATACATCGTGGTTGGAAGAGGGGACAAGCAGATAAACCATCAC
South_Africa_SAAR-1776_2001     CCACCATTCGGAGATTCATACATTGTGGTTGGAAGAGGAGACAAGCAGATAAACCATCAC
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Spain_MB119/06_2006,            TGGCACAAGGCAGGAAGCTCCATAGGAAAAGCGTTCATCACCACCATCAAAGGGGCACAG
Dakar_ArD192495,                TGGCACAAAGCAGGAAGCTCCATTGGAAAAGCGTTCATCACTACTATCAAAGGAGCACAG
Senegal_ArD101291_1993          TGGCACAAAGCAGGAAGCTCTATTGGAAAAGCGTTCATCACCACTATCAAAGGGGCACAG
Germania_V45_2011               TGGCACAAAGCAGGAAGTTCCATTGGAAAAGCGTTCATCACCACTATCAAAGGGGCACAG
Germany_V382_2013               TGGCACAAAGCAGGAAGTTCCATTGGAAAAGCGTTCATCACCACTATCAAAGGGGCACAG
Vienna_2001                     TGGCACAAAGCAGGAAGTTCCATTGGAAAAGCGTTCATCACCACTATCAAAGGGGCACAG
Bologna_2009                    TGGCACAAAGCAGGAAGCTCCATTGGAAAAGCGTTCATCACCACCATCAAAGGGGCACAG
Italia_2009                     TGGCACAAAGCAGGAAGTTCCATTGGAAAAGCGTTCATCACCACTATCAAAGGGGCACAG
Dakar_ArD19848_1974             TGGCATAAAGCAGGAAGCTCCATTGGAAAAGCGTTCATCACCACTATCAAAGGAGCACAG
South_Africa_SAAR-1776_2001     TGGCACAAAGCAGGAAGCTCCATTGGAAAAGCGTTCATCACCACTATCAAAGGAGCACAG
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Spain_MB119/06_2006,            CGTCTAGCTGCTCTAGGTGACACAGCTTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Dakar_ArD192495,                CGTCTAGCTGCCCTAGGTGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Senegal_ArD101291_1993          CGTCTAGCTGCCCTAGGCGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Germania_V45_2011               CGTCTAGCTGCCCTAGGCGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Germany_V382_2013               CGTCTAGCTGCCCTAGGCGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Vienna_2001                     CGTCTAGCTGCCCTAGGCGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Bologna_2009                    CGTCTAGCTGCCCTAGGCGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Italia_2009                     CGTCTAGCTGCCCTAGGCGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
Dakar_ArD19848_1974             CGTCTGGCAGCTCTAGGTGACACAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
South_Africa_SAAR-1776_2001     CGTTTAGCTGCTTTAGGCGATCCAGCGTGGGACTTTGGGTCGGTCGGAGGGATTTTCAAT
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Spain_MB119/06_2006,            TCCGTAGGAAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGGACTCTCTTCGGCGGC
Dakar_ArD192495,                TCTGTAGGGAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGAACTCTCTTTGGTGGC
Senegal_ArD101291_1993          TCTGTAGGGAAGGCGGTACATCAGGTTTTTGGAGGAGCCTTCAGAACTCTCTTCGGTGGC
Germania_V45_2011               TCTGTAGGAAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGAACTCTCTTCGGTGGC
Germany_V382_2013               TCTGTAGGAAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGAACTCTCTTCGGTGGC
Vienna_2001                     TCTGTAGGAAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGAACTCTCTTCGGTGGC
Bologna_2009                    TCTGTAGGAAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGAACTCTCTTCGGTGGC
Italia_2009                     TCTGTAGGAAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGAACTCTCTTCGGTGGC
Dakar_ArD19848_1974             TCTGTAGGGAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGGACTCTCTTCGGCGGT
South_Africa_SAAR-1776_2001     TCTGTAGGGAAGGCGGTACATCAGGTCTTTGGAGGAGCCTTCAGGACACTCTTCGGCGGC
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Spain_MB119/06_2006,            ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTGTGGATGGGAGTGAACGCG
Dakar_ArD192495,                ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTTTGCTTCTGTGGATGGGGGTGAATGCG
Senegal_ArD101291_1993          ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTATGGATGGGGGTGAATGCG
Germania_V45_2011               ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTATGGATGGGGGTGAATGCG
Germany_V382_2013               ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTATGGATGGGGGTGAATGCG
Vienna_2001                     ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTATGGATGGGGGTGAATGCG
Bologna_2009                    ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTATGGATGGGGGTGAATGCG
Italia_2009                     ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTATGGATGGGGGTGAATGCG
Dakar_ArD19848_1974             ATGTCCTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTCTGTGGATGGGGGTGAATGCG
South_Africa_SAAR-1776_2001     ATGTCTTGGATCACCCAGGGTCTAATGGGAGCTCTGCTTTTGTGGATGGGGGTGAATGCG
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Spain_MB119/06_2006,            AGAGATCGATCTATCGCACTGGTGATGTTAGCCACGGGAGGAGTGCTCCTCTTTCTCGCC
Dakar_ArD192495,                AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGAGTGCTCCTCTTTCTCGCC
Senegal_ArD101291_1993          AGAGACCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
Germania_V45_2011               AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
Germany_V382_2013               AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
Vienna_2001                     AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
Bologna_2009                    AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
Italia_2009                     AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
Dakar_ArD19848_1974             AGAGATAGATCCATCGCACTGGTGATGTTAGCCACGGGAGGTGTGCTCCTCTTTCTCGCC
South_Africa_SAAR-1776_2001     AGAGATCGATCCATCGCACTGGTGATGTTAGCCACGGGAGGGGTGCTCCTCTTTCTCGCC
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Spain_MB119/06_2006,            ACGAACGTCCATGCAGACTCGGGATGCGCGATAGACGTGGGGAGGAGAGAGTTGCGCTGT
Dakar_ArD192495,                ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Senegal_ArD101291_1993          ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Germania_V45_2011               ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Germany_V382_2013               ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Vienna_2001                     ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Bologna_2009                    ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Italia_2009                     ACAAACGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
Dakar_ArD19848_1974             ACAAACGTCCACGCAGACTCGGGATGTGCGATAGACGTAGGAAGGAGAGAGTTGCGCTGT
South_Africa_SAAR-1776_2001     ACAAGCGTCCATGCAGACTCGGGATGTGCGATAGACGTGGGAAGGAGAGAGTTGCGCTGT
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Spain_MB119/06_2006,            GGACAAGGGATCTTCATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTCATG
Dakar_ArD192495,                GGACAAGGGATCTTCATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
Senegal_ArD101291_1993          GGACAAGGGATCTTCATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
Germania_V45_2011               GGACAAGGGATTTTTATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
Germany_V382_2013               GGACAAGGGATTTTTATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
Vienna_2001                     GGACAAGGGATTTTTATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
Bologna_2009                    GGACAAGGGATTTTTATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
Italia_2009                     GGACAAGGGATTTTTATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTCATG
Dakar_ArD19848_1974             GGACAAGGGATCTTCATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
South_Africa_SAAR-1776_2001     GGACAAGGGATCTTCATCCACAATGATGTTGAAGCGTGGGTCGACCGGTACAAATTTATG
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Spain_MB119/06_2006,            CCTGAAACACCAAAACAACTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
Dakar_ArD192495,                CCTGAAACACCAAAACAGCTGGCAAAGGTCATTGAGCAAGCCCACGCGAAAGGAATATGT
Senegal_ArD101291_1993          CCTGAAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCAAAAGGAATATGT
Germania_V45_2011               CCTGAAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
Germany_V382_2013               CCTGAAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
Vienna_2001                     CCTGAAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
Bologna_2009                    CCTGGAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
Italia_2009                     CCTGGAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
Dakar_ArD19848_1974             CCTGAAACACCAAAACAGCTGGCAAAGGTCATCGAGCAAGCCCACGCGAAAGGAATATGT
South_Africa_SAAR-1776_2001     CCTGAGACACCAAAACAGCTGGCAAAGGTTATCGAGCAAGCCCACGCGAAAGGAATATGT
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Spain_MB119/06_2006,            GGACTGAGGTCTGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
Dakar_ArD192495,                GGATTGAGGTCCGTTTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGACGAACTC
Senegal_ArD101291_1993          GGATTGAGGTCCGTCTCACGTCTGGAGCACGTGATGTGGGAGAACATCAGAGATGAACTC
Germania_V45_2011               GGATTGAGGTCCGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
Germany_V382_2013               GGATTGAGGTCCGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
Vienna_2001                     GGATTGAGGTCCGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
Bologna_2009                    GGATTGAGGTCCGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
Italia_2009                     GGATTGAGGTCCGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
Dakar_ArD19848_1974             GGATTGAGGTCCGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
South_Africa_SAAR-1776_2001     GGATTGAGGTCTGTCTCACGTCTGGAACACGTGATGTGGGAGAACATCAGAGATGAACTC
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Spain_MB119/06_2006,            AACACCCTCCTTAGAGAGAATGCAGTAGACCTAAGTGTCGTGGTTGAGAAGCCAAAAGGA
Dakar_ArD192495,                AATACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCGAAAGGA
Senegal_ArD101291_1993          AACACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCAAAAGGA
Germania_V45_2011               AACACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCAAAAGGA
Germany_V382_2013               AACACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCAAAAGGA
Vienna_2001                     AACACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCAAAAGGA
Bologna_2009                    AACACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCAAAGGGA
Italia_2009                     AACACCCTCCTCAGAGAGAATGCAGTAGATCTAAGTGTCGTGGTTGAGAAGCCAAAGGGA
Dakar_ArD19848_1974             AACACCCTCCTTAGAGAGAATGCAGTAGACCTGAGTGTCGTGGTTGAGAAGCCAAAAGGA
South_Africa_SAAR-1776_2001     AACACCCTCCTCAGAGAGAATGCAGTAGACCTAAGTGTCGTGGTTGAGAAGCCAAAAGGA
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Spain_MB119/06_2006,            ATGTACAAATCAGCACCGCAGAGACTGGCACTCACGTCTGAAGAGTTTGAGATTGGGTGG
Dakar_ArD192495,                ATGTACAGATCAGCACCGCAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Senegal_ArD101291_1993          ATGTACAAATCAGCACCGCAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Germania_V45_2011               ATGTACAAATCAGCACCACAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Germany_V382_2013               ATGTACAAATCAGCACCACAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Vienna_2001                     ATGTACAAATCAGCACCACAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Bologna_2009                    ATGTACAAATCAGCACCACAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Italia_2009                     ATGTACAAATCAGCACCACAGAGATTGGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
Dakar_ArD19848_1974             ATGTACAGATCAGCACCGCAGAGACTAGCACTTACATCTGAAGAGTTTGAGATTGGGTGG
South_Africa_SAAR-1776_2001     ATGTACAAATCAGCACCGCAGAGACTAGCACTCACATCTGAAGAGTTTGAGATTGGGTGG
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Spain_MB119/06_2006,            AAGGCCTGGGGAAAGAGTTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Dakar_ArD192495,                AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAATTGGCCAACCACACTTTCGTGGTT
Senegal_ArD101291_1993          AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Germania_V45_2011               AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Germany_V382_2013               AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Vienna_2001                     AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Bologna_2009                    AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Italia_2009                     AAGGCTTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
Dakar_ArD19848_1974             AAAGCCTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACTTTTGTGGTT
South_Africa_SAAR-1776_2001     AAGGCCTGGGGAAAGAGCTTGGTGTTCGCACCAGAACTGGCCAACCACACCTTTGTGGTT
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Spain_MB119/06_2006,            GATGGGCCTGAGACTAAAGAATGCCCCGACGTAAAAAGAGCTTGGAACAGTCTTGAGATT
Dakar_ArD192495,                GACGGGCCCGAGACCAAAGAGTGTCCCGATGTAAAAAGAGCTTGGAACAGCCTTGAGATT
Senegal_ArD101291_1993          GACGGGCCCGAGACCAAAGAATGTCCCGATGTAAAAAGAGCTTGGAACAGCCTTGAGATT
Germania_V45_2011               GACGGGCCCGAGACCAAAGAATGTCCCGATGTAAAAAGAGCTTGGAACAGCCTTGAGATT
Germany_V382_2013               GACGGGCCCGAGACCAAAGAATGTCCCGATGTAAAAAGAGCTTGGAACAGCCTTGAGATT
Vienna_2001                     GACGGGCCCGAGACCAAAGAATGTCCCGATGCAAAAAGAGCTTGGAACAGCCTTGAGATT
Bologna_2009                    GACGGGCCCGAGACCAAAGAATGTCCCGATGTAAAAAGAGCTTGGAACAGCCTTGAGATT
Italia_2009                     GACGGGCCCGAGACCAAAGAATGTCCCGATGTAAAAAGAGCTTGGAACAGCCTTGAGATT
Dakar_ArD19848_1974             GATGGGCCCGAGACCAAGGAATGCCCCGATGCAAAAAGAGCTTGGAACAGCCTTGAGATT
South_Africa_SAAR-1776_2001     GATGGGCCTGAGACCAAAGAATGCCCCGACGTAAAAAGGGCTTGGAACAGCCTTGAGATT
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Spain_MB119/06_2006,            GAAGACTTTGGATTCGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAATACAAC
Dakar_ArD192495,                GAAGACTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Senegal_ArD101291_1993          GAAGACTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Germania_V45_2011               GAAGACTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Germany_V382_2013               GAAGACTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Vienna_2001                     GAAGACTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Bologna_2009                    GAAGATTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Italia_2009                     GAAGATTTTGGATTTGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAACACAAC
Dakar_ArD19848_1974             GAAGACTTTGGATTTGGTATCATGTCCACCAGGGTTTGGCTAAAAGTCAGAGAACACAAC
South_Africa_SAAR-1776_2001     GAAGACTTTGGATTCGGCATCATGTCCACCAGGGTTTGGCTGAAAGTCAGAGAGCACAAC
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Spain_MB119/06_2006,            ACTACCGACTGCGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Dakar_ArD192495,                ACTACTGACTGCGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Senegal_ArD101291_1993          ACCACTGACTGCGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Germania_V45_2011               ACTACTGACTGCGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Germany_V382_2013               ACTACTGACTGCGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Vienna_2001                     ACTACTGACTGCGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Bologna_2009                    ACTACTGACTGTGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Italia_2009                     ACTACTGACTGTGACAGCTCAATAATTGGGACGGCTGTTAAAGGAGACATAGCTGTGCAC
Dakar_ArD19848_1974             ACCACTGACTGCGACAGCTCAATAATTGGGACGGCTGTAAAAGGAGACATAGCTGTGCAC
South_Africa_SAAR-1776_2001     ACCACTGACTGCGACAGCTCAATAATTGGGACGGCCGTTAAAGGAGACATAGCTGTGCAC
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Spain_MB119/06_2006,            AGTGACCTCTCTTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGAGCT
Dakar_ArD192495,                AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Senegal_ArD101291_1993          AGTGACCTCTCCTATTGTATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Germania_V45_2011               AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Germany_V382_2013               AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Vienna_2001                     AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Bologna_2009                    AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Italia_2009                     AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTCGAGAGGGCT
Dakar_ArD19848_1974             AGTGACCTCTCCTACTGGATTGAAAGCCACAAGAACACGACATGGAGGCTAGAGAGAGCT
South_Africa_SAAR-1776_2001     AGTGACCTCTCCTACTGGATTGAAAGCCATAAGAACACGACATGGAGGCTTGAGAGAGCT
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Spain_MB119/06_2006,            GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGT
Dakar_ArD192495,                GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Senegal_ArD101291_1993          GTCTTTGGAGAGATCAAGTCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Germania_V45_2011               GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Germany_V382_2013               GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Vienna_2001                     GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Bologna_2009                    GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Italia_2009                     GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGC
Dakar_ArD19848_1974             GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGT
South_Africa_SAAR-1776_2001     GTCTTTGGAGAGATCAAATCATGCACGTGGCCTGAGACACACACTCTTTGGAGTGATGGT
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Spain_MB119/06_2006,            GTTGTTGAGAGTGATCTGGTTGTGCCAGTCACCCTCGCCGGGCCAAAAAGCAATCACAAC
Dakar_ArD192495,                GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGGCCAAAAAGCAATCACAAC
Senegal_ArD101291_1993          GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGGCCAAAAAGCAATCACAAC
Germania_V45_2011               GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGACCAAAAAGCAATCACAAC
Germany_V382_2013               GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGACCAAAAAGCAATCACAAC
Vienna_2001                     GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGACCAAAAAGCAATCACAAC
Bologna_2009                    GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGACCAAAAAGCAATCACAAC
Italia_2009                     GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGACCAAAAAGCAATCACAAC
Dakar_ArD19848_1974             GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTTGCTGGGCCAAAGAGCAATCACAAC
South_Africa_SAAR-1776_2001     GTTGTTGAAAGTGATCTGGTTGTGCCAGTCACCCTCGCTGGACCAAAAAGCAATCACAAC
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Spain_MB119/06_2006,            CGGCGTGAAGGTTACAAAGTCCAGAGCCAAGGGCCGTGGGATGAAGAAGACATCATTCTC
Dakar_ArD192495,                CGGCGTGAAGGTTACAAAGTCCAAAGCCAGGGGCCGTGGGACGAAGAAGACATCGTTCTC
Senegal_ArD101291_1993          CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGACGAAGAAGACATCGTTCTC
Germania_V45_2011               CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGACGAAGAAGACATCGTTCTC
Germany_V382_2013               CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGACGAAGAAGACATCGTTCTC
Vienna_2001                     CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGACGAAGAAGACATCGTTCTC
Bologna_2009                    CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGACGAAGAAGACATTGTTCTC
Italia_2009                     CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGACGAAGAAGACATTGTTCTC
Dakar_ArD19848_1974             CGGCGTGAAGGTTACAAAGTCCAGAGCCAAGGGCCGTGGGATGAAGAAGACATCGTTCTC
South_Africa_SAAR-1776_2001     CGGCGTGAAGGTTACAAAGTCCAGAGCCAGGGGCCGTGGGATGAAGAAGACATCGTTCTC
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Spain_MB119/06_2006,            GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Dakar_ArD192495,                GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Senegal_ArD101291_1993          GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Germania_V45_2011               GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Germany_V382_2013               GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Vienna_2001                     GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Bologna_2009                    GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Italia_2009                     GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
Dakar_ArD19848_1974             GACTTTGACTATTGCCCAGGTACTACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
South_Africa_SAAR-1776_2001     GACTTTGACTATTGCCCAGGTACCACCGTCACAATCACTGAAGCATGTGGGAAGAGAGGA
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Spain_MB119/06_2006,            CCCTCCATAAGAACTACCACTAGCAGTGGTAGATTGGTCACAGACTGGTGTTGTCGGAGC
Dakar_ArD192495,                CCCTCCATAAGAACTACCACTAGCAGTGGTAGATTGGTCACAGACTGGTGCTGCCGGAGC
Senegal_ArD101291_1993          CCCTCCATAAGAACTACTACTAGCAGTGGTAGATTGGTCACAGACTGGTGCTGCCGGAGC
Germania_V45_2011               CCCTCCATAAGAACTACTACTAGCAGTGGTAGACTGGTCACAGACTGGTGCTGCCGGAGC
Germany_V382_2013               CCCTCCATAAGAACTACTACTAGCAGTGGTAGACTGGTCACAGACTGGTGCTGCCGGAGC
Vienna_2001                     CCCTCCATAAGAACTACTACTAGCAGTGGTAGACTGGTCACAGACTGGTGCTGCCGGAGC
Bologna_2009                    CCCTCCATAAGAACTACTACTAGCAGTGGTAGACTGGTCACAGACTGGTGCTGCCGGAGC
Italia_2009                     CCCTCCATAAGAACTACTACTAGCAGTGGTAGACTGGTCACAGACTGGTGCTGCCGGAGC
Dakar_ArD19848_1974             CCCTCCATAAGAACTACTACCAGCAGTGGTAGATTGGTCACAGACTGGTGCTGCCGGAGC
South_Africa_SAAR-1776_2001     CCCTCCATAAGAACTACTACTAGCAGTGGTAGATTGGTCACAGACTGGTGCTGCCGGAGC
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Spain_MB119/06_2006,            TGCACCCTTCCCCCTTTGAGATATAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Dakar_ArD192495,                TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGCTGGTATGGAATGGAAATA
Senegal_ArD101291_1993          TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Germania_V45_2011               TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Germany_V382_2013               TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Vienna_2001                     TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Bologna_2009                    TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Italia_2009                     TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
Dakar_ArD19848_1974             TGCACCCTTCCCCCTTTGAGATACAGGACAAAAAATGGATGTTGGTATGGAATGGAGATA
South_Africa_SAAR-1776_2001     TGCACCCTTCCCCCTTTGAGATACAAGACAAAAAATGGATGTTGGTATGGAATGGAGATA
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Spain_MB119/06_2006,            AGACCCATGAAGCATGATGAGACGACGCTGGTAAAGTCCAGCGTTAGTGCCCACCGGAGT
Dakar_ArD192495,                AGACCCATGAAGCATGATGAGACGACGTTGGTAAAATCCAGCGTCAGTGCCTACCGGAGT
Senegal_ArD101291_1993          AGACCCATGAAACATGATGAGACGACGCTGGTAAAATCCAGCGTCAGTGCCTACCGGAGT
Germania_V45_2011               AGACCCATGAAACATGATGAGACGACGCTGGTAAAATCCAGCGTCAGTGCCTATCGGAGT
Germany_V382_2013               AGACCCATGAAACATGATGAGACGACGCTGGTAAAATCCAGCGTCAGTGCCTATCGGAGT
Vienna_2001                     AGACCCATGAAACATGATGAGACGACGCTGGTAAAATCCAGCGTCAGTGCCCATCGGAGT
Bologna_2009                    AGACCCATGAAACATGATGAGACGACGCTGGTAAAATCCAGCGTCAGTGCCTATCGGAGT
Italia_2009                     AGACCCATGAAACATGATGAGACGACGCTGGTAAAATCCAGCGTCAGTGCCTATCGGAGT
Dakar_ArD19848_1974             AGACCCATGAAGCATGATGAGACGACGTTGGTGAAGTCCAGCGTTAGTGCCTACCGGAGT
South_Africa_SAAR-1776_2001     AGACCCATGAAGCATGATGAGACGACGTTGGTAAAGTCTAGCGTTAGTGCCTACCGGAGT
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Spain_MB119/06_2006,            GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Dakar_ArD192495,                GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Senegal_ArD101291_1993          GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Germania_V45_2011               GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Germany_V382_2013               GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Vienna_2001                     GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Bologna_2009                    GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Italia_2009                     GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
Dakar_ArD19848_1974             GACATGATTGATCCTTTTCAGTTGGGCCTTCTGGTGATGTTTCTGGCCACCCAGGAGGTC
South_Africa_SAAR-1776_2001     GACATGATTGATCCTTTTCAGTTGGGCCTCCTGGTGATGTTTCTGGCCACCCAGGAGGTC
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Spain_MB119/06_2006,            CTGAGGAAGAGGTGGACGGCCAGGTTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Dakar_ArD192495,                CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Senegal_ArD101291_1993          CTGAGGAAGAGGTGGACGGCCAGATTGACTATTCCGGCTATTGTGGGAGCTCTACTCGTG
Germania_V45_2011               CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Germany_V382_2013               CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Vienna_2001                     CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Bologna_2009                    CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Italia_2009                     CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
Dakar_ArD19848_1974             CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
South_Africa_SAAR-1776_2001     CTGAGGAAGAGGTGGACGGCCAGATTGACTGTTCCGGCTATTGTGGGAGCTCTACTCGTG
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Spain_MB119/06_2006,            CTGATTCTTGGGGGAATCACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Dakar_ArD192495,                CTGATTCTTGGGGGAATTACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Senegal_ArD101291_1993          CTGATTCTTGGGGGAATTACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Germania_V45_2011               CTGATTCTTGGGGGAATCACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Germany_V382_2013               CTGATTCTTGGGGGAATCACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Vienna_2001                     CTGATTCTTGGGGGAATCACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Bologna_2009                    CTGATTCTTGGGGGAATCACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Italia_2009                     TTGATTCTTGGGGGAATCACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
Dakar_ArD19848_1974             CTGGTTCTTGGGGGAATTACCTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
South_Africa_SAAR-1776_2001     CTGATTCTTGGGGGAATTACTTACACTGACCTGCTTAGGTATGTTCTTCTGGTTGGGGCG
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Spain_MB119/06_2006,            GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTCCATCTAGCTCTCATAGCCGTTTTT
Dakar_ArD192495,                GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTCCATCTAGCTCTCATAGCCGCCTTT
Senegal_ArD101291_1993          GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTCCATCTAGCTCTCATAGCCGCCTTT
Germania_V45_2011               GCCTTCGCCGAAGCCAACAGCGGGGGTGACATCGTTCATCTAGCTCTCATAGCCGCCTTC
Germany_V382_2013               GCCTTCGCCGAAGCCAACAGCGGGGGTGACATCGTTCATCTAGCTCTCATAGCCGCCTTC
Vienna_2001                     GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTTCATCTAGCTCTCATAGCCGCCTTC
Bologna_2009                    GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTTCATCTAGCTCTCATAGCCGCCTTC
Italia_2009                     GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTTCATCTAGCTCTCATAGCCGCCTTC
Dakar_ArD19848_1974             GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTCCATCTAGCTCTCATAGCCGCCTTT
South_Africa_SAAR-1776_2001     GCCTTCGCCGAAGCCAACAGCGGGGGTGACGTCGTCCATCTAGCTCTCATAGCCGCCTTT
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Spain_MB119/06_2006,            AAAATCCAACCAGGCTTTCTCACAATGACATTTCTTAGGGGAAAGTGGACGAATCAAGAG
Dakar_ArD192495,                AAAATTCAACCAGGCTTTCTCGCAATGACATTTCTGAGGGGAAAGTGGACAAACCAAGAG
Senegal_ArD101291_1993          AAAATTCAACCAGGCTTTCTCGCAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
Germania_V45_2011               AAAATTCAACCAGGCTTTCTCGTAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
Germany_V382_2013               AAAATTCAACCAGGCTTTCTCGTAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
Vienna_2001                     AAAATTCAACCAGGCTTTCTCGCAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
Bologna_2009                    AAAATTCAACCAGGCTTTCTCGCAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
Italia_2009                     AAAATTCAACCAGGCTTTCTCGCAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
Dakar_ArD19848_1974             AAAATTCAACCAGGCTTTCTCGCCATGACATTTTTCAGGGGAAAGTGGACGAACCAAGAG
South_Africa_SAAR-1776_2001     AAAATCCAACCAGGCTTTCTCGCAATGACATTTCTTAGGGGAAAGTGGACGAACCAAGAG
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Spain_MB119/06_2006,            AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACTGATTTGAACTTC
Dakar_ArD192495,                AACATTCTGCTGGCTCTGGGGGCGGCATTCTTTCAGATGGCGGCCACCGATTTGAACTTT
Senegal_ArD101291_1993          AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGATTTGAACTTA
Germania_V45_2011               AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGATTTGAACTTT
Germany_V382_2013               AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGATTTGAACTTT
Vienna_2001                     AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGATTTGAACTTT
Bologna_2009                    AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGATTTGAACTTT
Italia_2009                     AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGACTTGAACTTT
Dakar_ArD19848_1974             AACATCCTGCTGGCTTTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGACTTGAACTTC
South_Africa_SAAR-1776_2001     AACATCCTGCTGGCTCTGGGGGCAGCATTCTTTCAGATGGCGGCCACCGATTTGGACCTC
                                ***** ********* ******* ********************** ** *** ** *

Spain_MB119/06_2006,            TCTTTCCCAGGAATTCTCAATGCCACTGCCACGGCTTGGATGCTCCTGAGGGCTGCCACC
Dakar_ArD192495,                TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCCTGGATGCTCCTGAGGGCTGCCACC
Senegal_ArD101291_1993          TCCCTTCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
Germania_V45_2011               TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCCGCCACC
Germany_V382_2013               TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
Vienna_2001                     TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
Bologna_2009                    TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
Italia_2009                     TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
Dakar_ArD19848_1974             TCTCTCCCAGGAATCCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
South_Africa_SAAR-1776_2001     TCTCTCCCAGGAATTCTCAATGCCACTGCCACAGCTTGGATGCTCCTGAGGGCTGCCACC
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Spain_MB119/06_2006,            CAGCCATCTACTTCTGCCATCGTCATGCCTTTGCTCTGCCTATTGGCTCCTGGCATGAGA
Dakar_ArD192495,                CAGCCATCCACTTCTGCCATCGTCATGCCCTTGCTTTGCCTGCTAGCTCCTGGCATGAGA
Senegal_ArD101291_1993          CAGCCATCCACTTCTGCCATCGTCATGCCTTTGCTTTGCCTGCTGGCTCCTGGCATGAGA
Germania_V45_2011               CAGCCATCCACTTCAGCCATCGTCATGCCTTTGCTTTGCCTGCTGGCTCCTGGCATGAGA
Germany_V382_2013               CAGCCATCCACTTCAGCCATCGTCATGCCTTTGCTTTGCCTGCTGGCTCCTGGCATGAGA
Vienna_2001                     CAGCCATCCACTTCAGCCATCGTCATGCCTTTGCTTTGCCTGCTGGCTCCTGGCATGAGA
Bologna_2009                    CAGCCATCCACTTCAGCCATCGTCATGCCTTTGCTTTGCCTGCTGGCTCCTGGCATGAGA
Italia_2009                     CAGCCATCCACTTCAGCCATCGTCATGCCTTTGCTTTGCCTGCTGGCTCCTGGCATGAGA
Dakar_ArD19848_1974             CAGCCATCCACTTCTGCCATCGTCATGCCTTTGCTCTGCCTACTGGCTCCTGGCATGAGA
South_Africa_SAAR-1776_2001     CAGCCATCCACTTCTGCCATCGTCATGCCTTTGCTCTGCCTACTGGCTCCTGGCATGAGA
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Spain_MB119/06_2006,            CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCATTTGCAGCCTGATA
Dakar_ArD192495,                CTGCTCTACCTGGACACGTACAGAATCACTCTCATCATCATCGGCATTTGCAGCCTGATA
Senegal_ArD101291_1993          CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCATTTGCAGCCTGATA
Germania_V45_2011               CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCATCTGCAGCCTGATA
Germany_V382_2013               CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCATCTGCAGCCTGATA
Vienna_2001                     CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCATCTGCAGCCTGATA
Bologna_2009                    CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCACCTGCAGCCTGATA
Italia_2009                     CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCACCTGCAGCCTGATA
Dakar_ArD19848_1974             CTGCTCTACCTGGACACGTATAGAATCACTCTCATCATCATCGGCATTTGCAGCCTGATA
South_Africa_SAAR-1776_2001     CTGCTCTACCTGGACACGTATAGAATTACTCTCATCATCATCGGCATTTGCAGCCTGATA
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Spain_MB119/06_2006,            GGGGAGCGCCGTAGAGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Dakar_ArD192495,                GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Senegal_ArD101291_1993          GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Germania_V45_2011               GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Germany_V382_2013               GGGGAGCGCCGTAGGGCAGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Vienna_2001                     GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Bologna_2009                    GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Italia_2009                     GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
Dakar_ArD19848_1974             GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGTTAGGGTTAGCACTC
South_Africa_SAAR-1776_2001     GGGGAGCGCCGTAGGGCGGCCGCAAAGAAGAAAGGGGCGGTACTGCTAGGGTTAGCACTA
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Spain_MB119/06_2006,            ACATCAACAGGGCAGTTTTCTGCGTCGGTTATGGCAGCTGGACTCATGGCATGCAATCCC
Dakar_ArD192495,                ACATCAACAGGGCAGTTCTCTGCGTCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Senegal_ArD101291_1993          ACATCAACAGGGCAGTTCTCTGCATCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Germania_V45_2011               ACATCAACAGGGCAGTTCTCTGCATCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Germany_V382_2013               ACATCAACAGGGCAGTTCTCAGCATCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Vienna_2001                     ACATCAACAGGGCAGTTCTCTGCATCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Bologna_2009                    ACATCAACAGGGCAGTTCTCTGCATCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Italia_2009                     ACATCAACAGGGCAGTTCTCTGCATCAGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
Dakar_ArD19848_1974             ACATCAACAGGACAGTTCTCTGCATCGGTTATGGCGGCTGGGCTCATGGCATGCAATCCC
South_Africa_SAAR-1776_2001     ACATCAACAGGGCAGTTCTCCGCGTCGGTTATGGCAGCTGGGCTCATGGCATGCAATCCC
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Spain_MB119/06_2006,            AACAAAAAGCGGGGGTGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Dakar_ArD192495,                AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Senegal_ArD101291_1993          AACAAAAAGCGGGGATGGCCGGCCACAGAGGTTTTGACAGCAGTTGGATTGATGTTTGCC
Germania_V45_2011               AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Germany_V382_2013               AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Vienna_2001                     AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Bologna_2009                    AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Italia_2009                     AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
Dakar_ArD19848_1974             AACAAAAAGCGGGGATGGCCGGCCACAGAAGTTTTGACAGCAGTTGGATTGATGTTTGCC
South_Africa_SAAR-1776_2001     AACAAAAAGCGGGGGTGGCCGGCCACAGAAGTTTTGACGGCAGTTGGATTGATGTTTGCT
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Spain_MB119/06_2006,            ATCGTGGGTGGTCTAGCTGAATTGGATGTTGATTCCATGTCCATTCCTTTTGTGTTGGCC
Dakar_ArD192495,                ATCGTGGGTGGTTTAGCTGAATTGGATGTTGATTCCATGTCCATTCCTTTTGTATTGGCC
Senegal_ArD101291_1993          ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCCATGTCCATTCCTTTTGTGTTGGCC
Germania_V45_2011               ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCTATGTCCATTCCTTTTGTGTTAGCC
Germany_V382_2013               ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCTATGTCCATTCCTTTTGTGTTAGCC
Vienna_2001                     ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCCATGTCCATTCCTTTTGTGTTAGCC
Bologna_2009                    ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCCATGTCCATTCCTTTTGTGTTAGCC
Italia_2009                     ATCGTGGGTGGTCTAGCTGAGTTGGACGTTGATTCCATGTCCATTCCTTTTGTGTTAGCC
Dakar_ArD19848_1974             ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCCATGTCCATTCCTTTTGTGTTGGCC
South_Africa_SAAR-1776_2001     ATCGTGGGTGGTCTAGCTGAGTTGGATGTTGATTCCATGTCCATTCCTTTTGTGTTGGCC
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Spain_MB119/06_2006,            GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAGTCGACAGACTTGTGGCTTGAGAGA
Dakar_ArD192495,                GGGCTGATGGCAGTTTCTTACACCATCTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
Senegal_ArD101291_1993          GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
Germania_V45_2011               GGGCTGATGGCAGTTTCTTACACCATCTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
Germany_V382_2013               GGGCTGATGGCAGTTTCTTACACCATCTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
Vienna_2001                     GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAATCGACAGACCTGTGGCTTGAGAGA
Bologna_2009                    GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
Italia_2009                     GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
Dakar_ArD19848_1974             GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAATCGACAGACTTGTGGCTTGAGAGA
South_Africa_SAAR-1776_2001     GGGCTGATGGCAGTTTCTTACACCATTTCAGGCAAGTCGACAGACCTGTGGCTTGAGAGA
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Spain_MB119/06_2006,            GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACCGGAACCAGCCAACGCTTAGAT
Dakar_ArD192495,                GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
Senegal_ArD101291_1993          GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
Germania_V45_2011               GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGTCTAGAT
Germany_V382_2013               GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
Vienna_2001                     GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
Bologna_2009                    GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
Italia_2009                     GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
Dakar_ArD19848_1974             GCAGCTGACATAACATGGGAAGCTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
South_Africa_SAAR-1776_2001     GCAGCTGACATAACATGGGAAACTGATGCAGCCATAACTGGAACCAGCCAACGCCTAGAT
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Spain_MB119/06_2006,            GTAAAACTGGATGATGATGGTGACTTCCACCTTGTTAACGACCCTGGAGTGCCGTGGAAG
Dakar_ArD192495,                GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Senegal_ArD101291_1993          GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Germania_V45_2011               GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Germany_V382_2013               GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Vienna_2001                     GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Bologna_2009                    GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Italia_2009                     GTAAAATTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
Dakar_ArD19848_1974             GTAAAACTGGATGATGATGGTGACTTCCACCTTATTAACGACCCTGGAGTGCCGTGGAAG
South_Africa_SAAR-1776_2001     GTAAAACTGGATGATGATGGTGACTTCCACCTTATCAACGACCCTGGAGTGCCGTGGAAG
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Spain_MB119/06_2006,            ATATGGGTCATCCGCATGACGGCACTAGGATTCGCAGCCTGGACGCCATGGGCAATAATA
Dakar_ArD192495,                ATATGGGTCATCCGCATGACGGCACTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
Senegal_ArD101291_1993          ATATGGGTCATCCGCATGACGGCACTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
Germania_V45_2011               ATATGGGTCATCCGTATGACGGCATTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
Germany_V382_2013               ATATGGGTCATCCGTATGACGGCATTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
Vienna_2001                     ATATGGGTCATCCGTATGACGGCATTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
Bologna_2009                    ATATGGGTCATCCGTATGACGGCATTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
Italia_2009                     ATATGGGTCATCCGTATGACGGCATTGGGATTCGCGGCCTGGACACCATGGGCAATAATA
Dakar_ArD19848_1974             ATATGGGTCATCCGCATGACGGCACTGGGATTCGCAGCCTGGACACCATGGGCAATAATA
South_Africa_SAAR-1776_2001     ATATGGGTCATCCGCATGACGGCACTAGGATTCGCAGCCTGGACACCATGGGCAATAATA
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Spain_MB119/06_2006,            CCTGCCGGAATAGGCTATTGGCTCACTGTCAAATACGCAAAAAGAGGAGGTGTCTTTTGG
Dakar_ArD192495,                CCTGCTGGAATAGGCTATTGGCTCACTGTTAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Senegal_ArD101291_1993          CCTGCTGGAATAGGCTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Germania_V45_2011               CCTGCTGGAATAGGTTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Germany_V382_2013               CCTGCTGGAATAGGTTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Vienna_2001                     CCTGCTGGAATAGGTTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Bologna_2009                    CCTGCTGGAATAGGTTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Italia_2009                     CCTGCTGGAATAGGTTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
Dakar_ArD19848_1974             CCTGCTGGAGTAGGCTATTGGCTCACTGTCAAGTACGCAAAAAGAGGAGGCGTCTTTTGG
South_Africa_SAAR-1776_2001     CCTGCTGGAATAGGCTATTGGCTCACTGTCAAATACGCAAAAAGAGGAGGCGTCTTTTGG
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Spain_MB119/06_2006,            GACACCCCGGCTCCAAGGACATACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Dakar_ArD192495,                GACACCCCGGCTCCAAGGACTTATCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Senegal_ArD101291_1993          GACACCCCGGCTCCAAGGACCTACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Germania_V45_2011               GACACCCCGGCTCCAAGGACCTACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Germany_V382_2013               GACACCCCGGCTCCAAGGACCTACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Vienna_2001                     GACACCCCGGCTCCAAGGACCTACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Bologna_2009                    GACACCCCGGCTCCAAGGACCTACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Italia_2009                     GACACCCCGGCTCCAAGGACCTACCCCAAGGGTGACACTTCACCAGGAGTATACCGTATC
Dakar_ArD19848_1974             GACACCCCGGCTCCAAGGACCTACCCTAAGGGTGACACTTCACCAGGAGTATACCGTATC
South_Africa_SAAR-1776_2001     GACACCCCGGCTCCAAGGACCTACCCCAAAGGTGACACTTCACCAGGAGTATACCGTATC
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Spain_MB119/06_2006,            ATGAGCCGTTACATTCTAGGGACCTACCAGGCTGGGGTGGGCGTCATGTATGAAGGAGTT
Dakar_ArD192495,                ATGAGCCGTTACATCCTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Senegal_ArD101291_1993          ATGAGCCGTTACATTTTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Germania_V45_2011               ATGAGCCGTTACATTTTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Germany_V382_2013               ATGAGCCGTTACATTTTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Vienna_2001                     ATGAGCCGTTACATTTTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Bologna_2009                    ATGAGCCGTTACATTTTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Italia_2009                     ATGAGCCGTTACATTTTGGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
Dakar_ArD19848_1974             ATGAGCCGTTACATTCTGGGGACCTACCAAGCTGGAGTGGGCGTCATGTATGAAGGAGTT
South_Africa_SAAR-1776_2001     ATGAGCCGTTACATTCTAGGGACCTACCAGGCTGGAGTGGGCGTCATGTATGAAGGAGTT
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Spain_MB119/06_2006,            CTTCATACCCTGTGGCACACCACAAGAGGGGCAGCCATCAGAAGTGGTGAAGGAAGGCTC
Dakar_ArD192495,                CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATCAGAAGTGGTGAAGGGAGGCTC
Senegal_ArD101291_1993          CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATCAGAAGTGGTGAAGGAAGGCTC
Germania_V45_2011               TTTCACACCCTGTGGCACACCACAAGAGGGGCAGCCATCAGAAGTGGTGAAGGAAGGCTC
Germany_V382_2013               TTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATCAGAAGTGGTGAAGGAAGGCTC
Vienna_2001                     CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATCAGAAGTGGTGAAGGAAGGCTC
Bologna_2009                    CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATCAGAAGTGGTGAAGGAAGGCTC
Italia_2009                     CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATCAGAAGTGGTGAAGGAAGGCTC
Dakar_ArD19848_1974             CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCCATCAGAAGTGGTGAAGGAAGGCTC
South_Africa_SAAR-1776_2001     CTTCACACCCTGTGGCACACCACAAGAGGGGCAGCTATTAGAAGTGGTGAAGGAAGGCTC
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Spain_MB119/06_2006,            ACTCCCTACTGGGGCAGTGTAAAAGAAGACAGGATCACCTATGGTGGACCATGGAAGTTT
Dakar_ArD192495,                ACCCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Senegal_ArD101291_1993          ACTCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Germania_V45_2011               ACTCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Germany_V382_2013               ACTCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Vienna_2001                     ACTCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Bologna_2009                    ACTCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Italia_2009                     ACTCCCTACTGGGGTAGTGTGAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
Dakar_ArD19848_1974             ACTCCCTACTGGGGCAGTGTGAAAGAAGACAGGATTACCTATGGTGGGCCATGGAAGTTT
South_Africa_SAAR-1776_2001     ACTCCCTACTGGGGCAGTGTAAAAGAAGACAGGATCACCTATGGTGGGCCATGGAAGTTT
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Spain_MB119/06_2006,            GACAGAAAGTGGAATGGTCTCGATGATGTCCAGCTCATCATAGTGGCCCCCGGAAAGGCA
Dakar_ArD192495,                GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCGTAGTGGCCCCCGGAAAGGCA
Senegal_ArD101291_1993          GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCATAGTGGCTCCCGGAAAGGCA
Germania_V45_2011               GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCATAGTGGCTCCCGGAAAGGCA
Germany_V382_2013               GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCATAGTGGCTCCCGGAAAGGCA
Vienna_2001                     GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCATAGTGGCTCCCGGAAAGGCA
Bologna_2009                    GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCGTAGTGGCTCCCGGAAAGGCA
Italia_2009                     GACAGGAAGTGGAATGGTCTCGATGATGTTCAGCTCATCGTAGTGGCTCCCGGAAAGGCA
Dakar_ArD19848_1974             GACAGAAAGTGGAATGGTCTCGATGATGTTCAGCTCATCATAGTGGCCCCCGGAAAGGCA
South_Africa_SAAR-1776_2001     GACAGAAAGTGGAATGGTCTTGATGATGTTCAGCTCATCATAGTGGCACCCGGAAAGGCA
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Spain_MB119/06_2006,            GCCATAAACATTCAAACCAAACCAGGTGTCTTCAAAACGCCACAAGGGGAAATAGGAGCA
Dakar_ArD192495,                GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAGGGGGAAATAGGAGCA
Senegal_ArD101291_1993          GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAGGGGGAAATAGGAGCA
Germania_V45_2011               GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAGGGGGAAATAGGAGCA
Germany_V382_2013               GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAGGGGGAAATAGGAGCA
Vienna_2001                     GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAGGGGGAAATAGGAGCA
Bologna_2009                    GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAGGGGGAAATAGGAGCA
Italia_2009                     GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAAGGGGAAATAGGAGCA
Dakar_ArD19848_1974             GCCATAAACATCCAAACCAAACCAGGCATCTTCAAAACGCCACAAGGAGAAATAGGAGCA
South_Africa_SAAR-1776_2001     GCCATAAACATCCAAACCAAACCAGGTGTCTTCAAAACTCCACAAGGGGAAATAGGAGCA
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Spain_MB119/06_2006,            GTCAGCTTGGACTATCCTGAAGGGACTTCAGGCTCCCCAATATTGGACAGGAATGGCGAC
Dakar_ArD192495,                GTCAGCCTGGACTATCCTGAAGGGACTTCAGGCTCCCCAATACTGGACAAGAATGGCGAC
Senegal_ArD101291_1993          GTCAGCCTGGACTATCCTGAAGGGACCTCAGGCTCCCCAATACTGGACAAGAATGGCGAC
Germania_V45_2011               GTCAGCCTGGACTATCCTGAAGGGACCTCAGGCTCCCCAATACTGGACAAGAATGGTGAC
Germany_V382_2013               GTCAGCCTGGACTATCCTGAAGGGACCTCAGGCTCCCCAATACTGGACAAGAATGGTGAC
Vienna_2001                     GTCAGCCTGGACTATCCTGAAGGGACCTCAGGCTCCCCAATACTGGACAAGAATGGTGAC
Bologna_2009                    GTCAGCCTGGACTATCCTGAAGGGACCTCAGGCTCCCCAATACTGGACAAGAATGGTGAC
Italia_2009                     GTCAGCCTGGACTATCCTGAAGGGACCTCAGGCTCCCCAATACTGGACAAGAATGGTGAC
Dakar_ArD19848_1974             GTCAGCCTGGACTATCCTGAAGGGACTTCAGGCTCCCCAATACTGGACAAGAATGGCGAC
South_Africa_SAAR-1776_2001     GTCAGCCTGGACTATCCTGAAGGGACTTCAGGCTCCCCAATACTGGACAAGAATGGCGAC
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Spain_MB119/06_2006,            ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Dakar_ArD192495,                ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Senegal_ArD101291_1993          ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Germania_V45_2011               ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Germany_V382_2013               ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Vienna_2001                     ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Bologna_2009                    ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Italia_2009                     ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
Dakar_ArD19848_1974             ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATT
South_Africa_SAAR-1776_2001     ATCGTGGGCTTGTACGGGAATGGAGTCATCTTGGGCAACGGCTCGTATGTCAGTGCCATC
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Spain_MB119/06_2006,            GTGCAAGGGGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAATGCAGACATGCTAAGA
Dakar_ArD192495,                GTGCAAGGCGAAAGAGAAGAAGAACCTGTTCCTGAAGCGTACAACGCAGACATGCTAAGA
Senegal_ArD101291_1993          GTGCAAGGCGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGACATGCTAAGA
Germania_V45_2011               GTGCAAGGCGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGATATGTTAAGA
Germany_V382_2013               GTGCAAGGCGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGATATGTTAAGA
Vienna_2001                     GTGCAAGGCGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGACATGTTAAGA
Bologna_2009                    GTGCAAGGCGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGACATGTTAAGA
Italia_2009                     GTGCAAGGCGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGACATGTTAAGA
Dakar_ArD19848_1974             GTGCAAGGGGAAAGAGAAGAAGAACCCGTTCCTGAAGCGTACAACGCAGACATGCTAAGA
South_Africa_SAAR-1776_2001     GTGCAAGGGGAAAGAGAAGAAGAACCCGTTCCCGAAGCGTACAACGCAGACATGTTAAGA
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Spain_MB119/06_2006,            AAGAAGCAACTAACAGTTTTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Dakar_ArD192495,                AAGAAGCAGCTGACAGTGTTGGACTTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Senegal_ArD101291_1993          AAGAAGCAGCTGACAGTGCTGGACCTTCATCCAGGGGCGGGAAAGACCAGGAGGATACTC
Germania_V45_2011               AAGAAGCAGCTGACAGTGCTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Germany_V382_2013               AAGAAGCAGCTGACAGTGCTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Vienna_2001                     AAGAAGCAGCTGACAGTGCTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Bologna_2009                    AAGAAGCAGCTGACAGTGCTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Italia_2009                     AAGAAGCAGCTGACAGTGCTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
Dakar_ArD19848_1974             AAGAAGCAGCTGACAGTTTTGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
South_Africa_SAAR-1776_2001     AAGAAGCAGCTGACAGTGATGGACCTGCATCCAGGAGCGGGAAAGACCAGGAGGATACTC
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Spain_MB119/06_2006,            CCCCAGATCATCAAAGATGCCATTCAGCGCCGCCTCCGCACGGCTGTGTTGGCTCCGACC
Dakar_ArD192495,                CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTCCGTACAGCTGTGCTGGCTCCAACC
Senegal_ArD101291_1993          CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTCCGTACAGCTGTGCTGGCTCCAACC
Germania_V45_2011               CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTTCGTACAGCTGTGCTGGCTCCAACC
Germany_V382_2013               CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTTCGTACAGCTGTGCTGGCTCCAACC
Vienna_2001                     CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTTCGTACAGCTGTGCTGGCTCCAACC
Bologna_2009                    CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTCCGTACAGCTGTGCTGGCTCCAACC
Italia_2009                     CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTCCGTACAGCTGTGCTGGCTCCAACC
Dakar_ArD19848_1974             CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTCCGTACAGCTGTGCTGGCTCCAACC
South_Africa_SAAR-1776_2001     CCCCAGATCATCAAAGATGCCATCCAGCGCCGCCTCCGCACAGCTGTGCTGGCTCCAACC
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Spain_MB119/06_2006,            CGTGTGGTGGCTGCAGAAATGGCTGAGGCTCTCAAGGGCCTTCCGGTCCGATACTTGACC
Dakar_ArD192495,                CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCCGTCCGATACCTGACC
Senegal_ArD101291_1993          CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCGGTCCGATACCTGACC
Germania_V45_2011               CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCGGTCCGATACCTGACC
Germany_V382_2013               CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCGGTCCGATACCTGACC
Vienna_2001                     CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCGGTCCGATACCTGACC
Bologna_2009                    CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCGGTCCGATACCTGACC
Italia_2009                     CGTGTGGTGGCTGCAGAAATGGCTGAGGCCCTCAAGGGCCTTCCGGTCCGATACCTGACC
Dakar_ArD19848_1974             CGTGTGGTGGCTGCGGAAATGGCTGAGGCTCTCAAGGGCCTTCCGGTCCGATACTTGACC
South_Africa_SAAR-1776_2001     CGTGTGGTGGCTGCAGAAATGGCTGAAGCTCTCAAGGGCCTTCCGGTCCGATACTTGACC
                                ************** *********** ** ************** ********* *****

Spain_MB119/06_2006,            CCAGCGGTCAATAGAGAGCATAGCGGCACAGAGATAGTGGATGTTATGTGTCATGCTACT
Dakar_ArD192495,                CCAGCGGTCAACAGAGAGCATAGCGGCACAGAGATAGTGGATGTCATGTGTCATGCCACT
Senegal_ArD101291_1993          CCAGCGGTCAACAGAGAGCATAGCGGCACAGAGATAGTGGATGTCATGTGTCATGCCACT
Germania_V45_2011               CCAGCGGTCAACAGAGAGCATAGTGGCACAGAGATAGTGGATGTTATGTGTCATGCCACT
Germany_V382_2013               CCAGCGGTCAACAGAGAGCATAGTGGCACAGAGATAGTGGATGTTATGTGTCATGCCACT
Vienna_2001                     CCAGCGGTCAACAGAGAGCATAGTGGCACAGAGATAGTGGATGTTATGTGTCATGCCACT
Bologna_2009                    CCAGCAGTCAACAGAGAGCATAGTGGCACAGAGATAGTGGATGTTATGTGTCATGCCACT
Italia_2009                     CCAGCGGTCAACAGAGAGCATAGTGGCACAGAGATAGTGGATGTTATGTGTCATGCCACT
Dakar_ArD19848_1974             CCAGCAGTCAACAGAGAGCATAGTGGCACAGAGATAGTGGATGTCATGTGTCATGCCACT
South_Africa_SAAR-1776_2001     CCAGCGGTCAACAGAGAGCATAGCGGCACAGAGATAGTGGATGTCATGTGTCATGCCACT
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Spain_MB119/06_2006,            CTAACCTACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Dakar_ArD192495,                CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Senegal_ArD101291_1993          CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Germania_V45_2011               CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Germany_V382_2013               CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Vienna_2001                     CTAACCCACAGACTCATGTCACCTCTAAGAGCTCCAAACTACAACCTCTTTGTGATGGAT
Bologna_2009                    CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Italia_2009                     CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
Dakar_ArD19848_1974             CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
South_Africa_SAAR-1776_2001     CTAACCCACAGACTCATGTCACCTCTAAGAGTTCCAAACTACAACCTCTTTGTGATGGAT
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Spain_MB119/06_2006,            GAAGCCGACTTCACTGATCCAGCGAGCATAGCAGCACGAGGCTATATTGCCACAAAAGTT
Dakar_ArD192495,                GAGGCTCACTTCACTGACCCAGCGAGCATAGCAGCACGAGGCTACATTGCCACAAAAGTT
Senegal_ArD101291_1993          GAGGCTCACTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCCACAAAAGTT
Germania_V45_2011               GAGGCTCACTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCTACAAAAGTT
Germany_V382_2013               GAGGCTCACTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCTACAAAAGTT
Vienna_2001                     GAGGCTCACTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCTACAAAAGTT
Bologna_2009                    GAGGCTCACTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCTACAAAAGTT
Italia_2009                     GAGGCTCACTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCTACAAAAGTT
Dakar_ArD19848_1974             GAAGCTCATTTCACTGACCCGGCGAGCATAGCAGCACGAGGCTACATTGCCACAAAAGTT
South_Africa_SAAR-1776_2001     GAAGCTCACTTCACTGATCCGGCGAGCATAGCAGCACGAGGCTATATTGCCACAAAAGTT
                                ** **  * ******** ** ********************** ***** *********

Spain_MB119/06_2006,            GAGTTGGGCGAAGCGGCAGCAATATTCATGACTGCAACTCCCCCTGGTACTCACGATCCG
Dakar_ArD192495,                GAGTTGGGCGAAGCGGCAGCAATATTTATGACTGCGACTCCCCCTGGCACTCACGATCCG
Senegal_ArD101291_1993          GAGTTGGGTGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
Germania_V45_2011               GAGTTGGGTGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
Germany_V382_2013               GAGTTGGGTGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
Vienna_2001                     GAGTTGGGTGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
Bologna_2009                    GAGTTGGGTGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
Italia_2009                     GAGTTGGGTGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
Dakar_ArD19848_1974             GAGTTGGGCGAAGCGGCAGCAATATTCATGACTGCGACTCCCCCTGGCACTCACGATCCG
South_Africa_SAAR-1776_2001     GAGTTGGGCGAAGCGGCAGCAATATTCATGACTGCAACTCCCCCTGGCACTCACGATCCG
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Spain_MB119/06_2006,            TTCCCAGACACCAATGCACCAGTCACAGACATACAAGCTGAGGTGCCCGACAGAGCCTGG
Dakar_ArD192495,                TTCCCAGACACCAATGCGCCAGTTACAGACATACAAGCTGAGGTGCCTGATAGAGCCTGG
Senegal_ArD101291_1993          TTCCCAGACACCAATGCACCAGTTACAGACATACAGGCTGAGGTGCCTGACAGAGCCTGG
Germania_V45_2011               TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAGGTGCCTGACAGAGCCTGG
Germany_V382_2013               TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAGGTGCCTGACAGAGCCTGG
Vienna_2001                     TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAGGTGCCTGACAGAGCCTGG
Bologna_2009                    TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAGGTGCCTGACAGAGCCTGG
Italia_2009                     TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAGGTGCCTGACAGAGCCTGG
Dakar_ArD19848_1974             TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAAGTGCCTGACAGAGCCTGG
South_Africa_SAAR-1776_2001     TTCCCAGACACCAATGCACCAGTTACAGACATACAAGCTGAGGTGCCTGACAGAGCCTGG
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Spain_MB119/06_2006,            AGTAGTGGATTTGAGTGGATAACAGAATACACCGGGAAAACCGTCTGGTTTGTTGCTAGT
Dakar_ArD192495,                AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTTGTCGCTAGT
Senegal_ArD101291_1993          AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTTGTCGCTAGT
Germania_V45_2011               AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTTTGGTTCGTCGCTAGT
Germany_V382_2013               AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTTTGGTTCGTCGCTAGT
Vienna_2001                     AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTCGTCGCTAGT
Bologna_2009                    AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTCGTCGCTAGT
Italia_2009                     AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTCGTCGCTAGT
Dakar_ArD19848_1974             AGCAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTTGTCGCTAGT
South_Africa_SAAR-1776_2001     AGTAGTGGGTTTGAGTGGATAACAGAATACACCGGGAAAACAGTCTGGTTTGTTGCTAGC
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Spain_MB119/06_2006,            GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAAAGAGCGGGAAAGAAGGTCATCCAA
Dakar_ArD192495,                GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGGAAAAAGGTCATTCAA
Senegal_ArD101291_1993          GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATCCAG
Germania_V45_2011               GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATCCAA
Germany_V382_2013               GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATCCAA
Vienna_2001                     GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATCCAA
Bologna_2009                    GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATTCAA
Italia_2009                     GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATTCAA
Dakar_ArD19848_1974             GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAGAGAGCGGGAAAGAAGGTCATCCAA
South_Africa_SAAR-1776_2001     GTGAAGATGGGAAATGAGATTGCACAGTGTCTTCAAAGAGCGGGAAAGAAGGTCATCCAA
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Spain_MB119/06_2006,            CTCAACCGCAAGTCTTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Dakar_ArD192495,                CTCAACCGTAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Senegal_ArD101291_1993          CTCAACCGCAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Germania_V45_2011               CTCAACCGCAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Germany_V382_2013               CTCAACCGCAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Vienna_2001                     CTCAACCGCAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Bologna_2009                    CTCAACCGCAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Italia_2009                     CTCAACCGCAAGTCCTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
Dakar_ArD19848_1974             CTCAACCGCAAGTCTTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGACTTT
South_Africa_SAAR-1776_2001     CTCAACCGCAAGTCTTATGACACGGAGTATCCCAAATGCAAGAATGGAGACTGGGATTTT
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Spain_MB119/06_2006,            GTGATAACAACAGACATCTCAGAGATGGGTGCGAACTTTGGGGCCAGCAGGGTCATTGAC
Dakar_ArD192495,                GTGATAACAACAGACATCTCAGAGATGGGCGCGAACTTTGGGGCTAGCAGAGTCATTGAC
Senegal_ArD101291_1993          GTGATAACAACAGACATCTCAGAGATGGGCGCGAACTTTGGGGCCAGCAGAGTCATTGAC
Germania_V45_2011               GTGATAACAACAGACATCTCAGAGATGGGCGCGAACTTTGGGGCCAGCAGAGTCATTGAC
Germany_V382_2013               GTGATAACAACAGACATCTCAGAGATGGGCGCGAACTTTGGGGCCAGCAGAGTCATTGAC
Vienna_2001                     GTGATAACAACAGACATCTCAGAGATGGGCGCGAACTTTGGGGCCAGCAGAGTCATTGAC
Bologna_2009                    GTGATAACAACAGACATCTCAGAGATGGGTGCGAACTTTGGGGCCAGCAGAGTCATTGAC
Italia_2009                     GTGATAACAACAGACATCTCAGAGATGGGCGCGAACTTTGGGGCCAGCAGAGTCATTGAC
Dakar_ArD19848_1974             GTGATAACAACAGACATCTCAGAGATGGGTGCGAACTTTGGGGCCAGCAGAGTCATTGAC
South_Africa_SAAR-1776_2001     GTGATAACAACAGACATCTCAGAGATGGGTGCGAACTTTGGGGCCAGCAGAGTCATTGAC
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Spain_MB119/06_2006,            TGCCGGAAAAGCGTAAAACCCACCATTCTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Dakar_ArD192495,                TGCCGGAAAAGCGTGAAACCCACCATTTTGGAGGAAGGCGATGGGAGAGTGATTTTGAGC
Senegal_ArD101291_1993          TGCCGGAAAAGCGTGAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Germania_V45_2011               TGTCGGAAAAGCGTGAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Germany_V382_2013               TGTCGGAAAAGCGTGAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Vienna_2001                     TGTCGGAAAAGCGTGAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Bologna_2009                    TGTCGGAAAAGCGTAAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Italia_2009                     TGTCGGAAAAGCGTAAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
Dakar_ArD19848_1974             TGCCGGAAAAGCGTGAAACCCACCATTTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
South_Africa_SAAR-1776_2001     TGCCGGAAAAGCGTGAAACCCACCATCTTGGAGGAAGGCGAAGGGAGAGTGATCTTGAGC
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Spain_MB119/06_2006,            AACCCCTCACCAATCACTAGTGCTAGTGCCGCCCAGAGGAGAGGAAGAGTAGGCAGAAAT
Dakar_ArD192495,                AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTAGGTAGAAAT
Senegal_ArD101291_1993          AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTAGGCAGAAAT
Germania_V45_2011               AACCCCTCACCAATCACCAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTGGGTAGAAAT
Germany_V382_2013               AACCCCTCACCAATCACCAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTAGGTAGAAAT
Vienna_2001                     AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTAGGTAGAAAT
Bologna_2009                    AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTAGGTAGAAAT
Italia_2009                     AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGGAGAGGGAGAGTAGGTAGAAAT
Dakar_ArD19848_1974             AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGAAGAGGAAGAGTAGGTAGAAAT
South_Africa_SAAR-1776_2001     AACCCCTCACCAATCACTAGTGCTAGTGCTGCCCAGAGGAGAGGAAGAGTAGGTAGAAAT
                                ***************** *********** ******** ***** ***** ** ******

Spain_MB119/06_2006,            CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAAGCACAAGCGAAGATGACACGATT
Dakar_ArD192495,                CCTAGTCAGATAGGTGATGAGTACCACTACGGAGGAGGCACAAACGAAGATGACACGATC
Senegal_ArD101291_1993          CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
Germania_V45_2011               CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
Germany_V382_2013               CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
Vienna_2001                     CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
Bologna_2009                    CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
Italia_2009                     CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
Dakar_ArD19848_1974             CCTAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
South_Africa_SAAR-1776_2001     CCGAGTCAGATAGGTGATGAGTACCACTATGGAGGAGGCACAAGCGAAGATGACACGATC
                                ** ************************** ****** ****** ***************

Spain_MB119/06_2006,            GCGGCTCATTGGACTGAAGCAAAGATCATGTTAGACAACATCCACCTCCCAAATGGGCTT
Dakar_ArD192495,                GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
Senegal_ArD101291_1993          GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
Germania_V45_2011               GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
Germany_V382_2013               GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
Vienna_2001                     GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAATATCCACCTCCCAAATGGGCTT
Bologna_2009                    GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
Italia_2009                     GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
Dakar_ArD19848_1974             GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGATAACATCCACCTCCCAAATGGGCTT
South_Africa_SAAR-1776_2001     GCAGCTCATTGGACTGAAGCAAAGATCATGTTAGACAACATCCACCTCCCAAATGGGCTT
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Spain_MB119/06_2006,            ATTGCACAAATGTATGGGCCAGAAAGAGACAAAGCTTTCACCATGGACGGGGAGTACCGG
Dakar_ArD192495,                GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTTACCATGGACGGGGAGTACCGG
Senegal_ArD101291_1993          GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTCACCATGGACGGGGAGTACCGG
Germania_V45_2011               GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTCACCATGGACGGGGAGTACCGA
Germany_V382_2013               GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTCACCATGGACGGGGAGTACCGA
Vienna_2001                     GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTCACCATGGACGGGGAGTACCGA
Bologna_2009                    GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTCACCATGGACGGGGAGTACCGA
Italia_2009                     GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCCTTCACCATGGACGGGGAGTACCGA
Dakar_ArD19848_1974             GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCTTTCACCATGGACGGGGAGTACCGG
South_Africa_SAAR-1776_2001     GTTGCACAAATGTATGGGCCAGAAAGAGACAAAGCTTTCACCATGGACGGGGAGTACCGT
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Spain_MB119/06_2006,            CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAATTATTGAGGACTGCAGACCTGCCAGTG
Dakar_ArD192495,                CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAGTTGTTGAGGACTGCGGACCTGCCAGTG
Senegal_ArD101291_1993          TTGAGAGGAGAAGAGAGAAAGACCTTCCTGGAGTTGCTGAGGACTGCAGACCTGCCAGTG
Germania_V45_2011               CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAGTTGCTGAGGACTGCAGACCTGCCAGTG
Germany_V382_2013               CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAGTTGCTGAGGACTGCAGACCTGCCAGTG
Vienna_2001                     CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAGTTGCTGAGGACTGCAGACCTGCCAGTG
Bologna_2009                    CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAGTTGCTGAGGACTGCAGACCTGCCAGTG
Italia_2009                     CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAGTTGCTGAGGACTGCAGACCTGCCAGTG
Dakar_ArD19848_1974             CTGAGAGGAGAGGAGAGAAAGACCTTCCTGGAATTGTTGAGGACTGCAGACCTGCCAGTG
South_Africa_SAAR-1776_2001     CTGATAGGACAGGAGAGAAAGACCTTCCTGGAGTTGTTGAGGACTGCAGACCTGCCAGTG
                                 *** **** * ********************  **  ********** ************

Spain_MB119/06_2006,            TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
Dakar_ArD192495,                TGGCTTGCTTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
Senegal_ArD101291_1993          TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
Germania_V45_2011               TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGCTTT
Germany_V382_2013               TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGCTTT
Vienna_2001                     TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
Bologna_2009                    TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
Italia_2009                     TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
Dakar_ArD19848_1974             TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGATAGGAAGTGGTGTTTT
South_Africa_SAAR-1776_2001     TGGCTTGCCTACAAAGTGGCTTCAAATGGTATACAGTACACCGACAGGAAGTGGTGTTTT
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Spain_MB119/06_2006,            GATGGACCCAGGTCAAACGTCATCCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Dakar_ArD192495,                GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Senegal_ArD101291_1993          GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Germania_V45_2011               GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Germany_V382_2013               GATGGACCAAGGTCAAACATTATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Vienna_2001                     GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Bologna_2009                    GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Italia_2009                     GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
Dakar_ArD19848_1974             GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
South_Africa_SAAR-1776_2001     GATGGACCAAGGTCAAACATCATTCTGGAAGACAACAATGAAGTCGAAATTGTCACCCGC
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Spain_MB119/06_2006,            ACAGGTGAGCGCAAGATGCTGAAGCCACGCTGGCTAGATGCCAGGGTCTATTCCGACCAT
Dakar_ArD192495,                ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTAGATGCCAGGGTCTACGCTGACCAT
Senegal_ArD101291_1993          ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTGGACGCCAGGGTCTACGCTGACCAT
Germania_V45_2011               ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTGGATGCCAGGGTCTACGCTGACCAT
Germany_V382_2013               ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTGGATGCCAGGGTCTACGCTGACCAT
Vienna_2001                     ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTGGATGCCAGGGTCTACGCTGACCAT
Bologna_2009                    ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTGGATGCCAGGGTCTACGCTGACCAT
Italia_2009                     ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTGGATGCCAGGGTCTACGCTGACCAT
Dakar_ArD19848_1974             ACAGGTGAACGCAAGATGCTGAAGCCACGCTGGTTAGATGCCAGGGTCTATTCCGACCAT
South_Africa_SAAR-1776_2001     ACAGGCGAACGCAAGATGCTGAAGCCACGCTGGTTGGATGCCAGGGTCTACTCCGACCAT
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Spain_MB119/06_2006,            CAATCGCTCAAGTGGTTCAAGGACTTCGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
Dakar_ArD192495,                CAATCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGCAAGCGATCAGCAGTGGGATTCCTT
Senegal_ArD101291_1993          CAATCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
Germania_V45_2011               CAGTCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
Germany_V382_2013               CAGTCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
Vienna_2001                     CAGTCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
Bologna_2009                    CAGTCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
Italia_2009                     CAGTCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTTCTT
Dakar_ArD19848_1974             CAATCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
South_Africa_SAAR-1776_2001     CAATCGCTCAAGTGGTTCAAGGACTTTGCGGCTGGTAAGCGATCAGCAGTGGGATTCCTT
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Spain_MB119/06_2006,            GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCTGGCAAAACCAGAGAGGCTTTTGACACC
Dakar_ArD192495,                GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAAACCAGAGAGGCTTTTGATACC
Senegal_ArD101291_1993          GAAGTTCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAAACCAGAGAGGCCTTTGATACC
Germania_V45_2011               GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAGACCAGAGAGGCTTTTGATACC
Germany_V382_2013               GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAGACCAGAGAGGCTTTTGATACC
Vienna_2001                     GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAGACCAGAGAGGCTTTTGATACC
Bologna_2009                    GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAGACCAGAGAGGCTTTTGATACC
Italia_2009                     GAAGTCCTGGGGAGAATGCCTGAGCACTTCGCAGGCAAGACCAGAGAGGCTTTTGATACC
Dakar_ArD19848_1974             GAAGTCCTGGGGAGGATGCCTGAGCACTTCGCAGGCAAAACCAGAGAGGCTTTTGACACC
South_Africa_SAAR-1776_2001     GAAGTCCTGGGGAGAATGCCTGAACACTTCGCAGGCAAAACCAGAGAGGCCTTTGATACC
                                ***** ******** ******** ******** ***** *********** ***** ***

Spain_MB119/06_2006,            ATGTATCTGGTGGCGACAGCCGAGAAGGGAGGAAAAGCCCACCGCATGGCTCTTGAAGAG
Dakar_ArD192495,                ATGTATCTGGTGGCGACAGCGGAGAAGGGAGGAAAAGCCCACCGTATGGCCCTTGAAGAG
Senegal_ArD101291_1993          ATGTATCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGTATGGCCCTTGAAGAG
Germania_V45_2011               ATGTATCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGCATGGCCCTTGAAGAG
Germany_V382_2013               ATGTATCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGCATGGCCCTTGAAGAG
Vienna_2001                     ATGTATCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGCATGGCCCTTGAAGAG
Bologna_2009                    ATGTATCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGCATGGCCCTTGAAGAG
Italia_2009                     ATGTATCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGCATGGCCCTTGAAGAG
Dakar_ArD19848_1974             ATGTACCTGGTGGCGACAGCTGAGAAGGGAGGAAAAGCCCACCGTATGGCTCTTGAAGAG
South_Africa_SAAR-1776_2001     ATGTATCTGGTGGCGACAGCCGAGAAGGGAGGAAAAGCCCACCGCATGGCCTTTGAAGAG
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Spain_MB119/06_2006,            TTGCCGGACGCTCTTGAGACTATAACGCTCATTGTGGCTCTGGCCGTGATGACAGCAGGA
Dakar_ArD192495,                TTGCCGGACGCTCTTGAGACTATAACACTCATTGTGGCTTTGGCCGTAATGACAGCAGGA
Senegal_ArD101291_1993          TTGCCGGACGCTCTTGAGACCATAACACTCATTGTAGCTTTGGCCGTGATGACAGCAGGA
Germania_V45_2011               TTGCCGGACGCTCTTGAAACCATAACACTCATTGTGGCTTTGGCTGTGATGACAGCAGGA
Germany_V382_2013               TTGCCGGACGCTCTTGAAACCATAACACTCATTGTGGCTTTGGCTGTGATGACAGCAGGA
Vienna_2001                     TTGCCGGACGCTCTTGAAACCATAACACTCATTGTGGCTTTGGCCGTGATGACAGCAGGA
Bologna_2009                    TTGCCGGACGCTCTTGAAACCATAACACTCATTGTGGCTTTGGCCGTGATGACAGCAGGA
Italia_2009                     TTGCCGGACGCTCTTGAAACCATAACACTCATTGTGGCTTTGGCCGTGATGACAGCAGGA
Dakar_ArD19848_1974             TTGCCGGACGCTCTTGAAACTATAACACTCATTGTGGCTCTGGCCGTGATGACAGCAGGA
South_Africa_SAAR-1776_2001     TTGCCGGACGCTCTTGAGACTATAACACTCATTGTGGCTCTGGCCGTGATGACAGCAGGA
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Spain_MB119/06_2006,            GTTTTCTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGTTGGGGCTTGGTGGCATGGTG
Dakar_ArD192495,                GTTTTCTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGCATGGTG
Senegal_ArD101291_1993          GTTTTCTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGTATGGTG
Germania_V45_2011               GTTTTTTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGTATGGTG
Germany_V382_2013               GTTTTCTTGCTCCTCGTGCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGTATGGTG
Vienna_2001                     GTTTTCTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGTATGGTG
Bologna_2009                    GTTTTCTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGTATGGTG
Italia_2009                     GTTTTCTTGCTCCTCGTTCAGAGGAGAGGCATAGGTAAGCTGGGGCTTGGCGGTATGGTG
Dakar_ArD19848_1974             GTTTTCTTGCTCCTCGTTCAGAGGAGAGGTATAGGTAAGCTGGGGCTTGGTGGTATGGTG
South_Africa_SAAR-1776_2001     GTTTTCTTGCTCCTCGTTCAGAGGAGAGGTATAGGTAAGCTGGGGCTTGGTGGTATGGTG
                                ***** ********** ********** ********* ********** ** ******

Spain_MB119/06_2006,            CTAGGCTTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Dakar_ArD192495,                CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Senegal_ArD101291_1993          CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Germania_V45_2011               CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Germany_V382_2013               CTAGGCCTAGCTACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Vienna_2001                     CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Bologna_2009                    CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Italia_2009                     CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
Dakar_ArD19848_1974             CTAGGCTTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATAGCAGGA
South_Africa_SAAR-1776_2001     CTAGGCCTAGCCACTTTCTTCTTGTGGATGGCTGACGTCTCAGGCACCAAGATCGCAGGA
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Spain_MB119/06_2006,            ACTTTATTGCTGGCTTTACTCATGATGATAGTGTTGATCCCTGAACCTGAAAAGCAACGA
Dakar_ArD192495,                ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGG
Senegal_ArD101291_1993          ACCTTACTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
Germania_V45_2011               ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
Germany_V382_2013               ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
Vienna_2001                     ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
Bologna_2009                    ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
Italia_2009                     ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
Dakar_ArD19848_1974             ACCTTATTGCTGGCTCTGCTCATGATGATAGTGTTGATTCCTGAACCTGAGAAGCAACGA
South_Africa_SAAR-1776_2001     ACTCTATTGCTGGCTCTGCTCATGATGATAGTGTTGATCCCTGAACCTGAGAAGCAACGA
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Spain_MB119/06_2006,            TCCCAAACGGACAACCAGCTTGCTGTGTTTCTGATCTGTGTCTTGCTGGTAGTGGGAGTG
Dakar_ArD192495,                TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
Senegal_ArD101291_1993          TCCCAGACGGACAACCAGCTAGCTGTATTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
Germania_V45_2011               TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTAGGAGTG
Germany_V382_2013               TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
Vienna_2001                     TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
Bologna_2009                    TCCCAGACGGACAATCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
Italia_2009                     TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
Dakar_ArD19848_1974             TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
South_Africa_SAAR-1776_2001     TCCCAGACGGACAACCAGCTAGCTGTGTTTCTGATCTGTGTCTTGCTGGTGGTGGGAGTG
                                ***** ******** ***** ***** ********************** ** ******

Spain_MB119/06_2006,            GTGGCTGCAAATGAATACGGAATGTTAGAGAGAACAAAAAGTGATCTTGGGAAAATGTTC
Dakar_ArD192495,                GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATGTTC
Senegal_ArD101291_1993          GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATGTTC
Germania_V45_2011               GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATATTC
Germany_V382_2013               GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATATTC
Vienna_2001                     GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATATTC
Bologna_2009                    GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACTAAAAGTGACCTTGGGAAAATATTC
Italia_2009                     GTGGCTGCCAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATATTC
Dakar_ArD19848_1974             GTGGCTGCAAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATGTTT
South_Africa_SAAR-1776_2001     GTGGCTGCAAATGAATACGGAATGTTAGAGAGAACAAAAAGTGACCTTGGGAAAATGTTC
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Spain_MB119/06_2006,            TCCAGCACACGTCAACCACAGAGTGCTCTGCCGCTACATTCCATGAACGCTTTGGCATTG
Dakar_ArD192495,                TCCAGCACACGTCAACCACAGAATGCTTTGCCGCTACCCTCCATGAACGCTTTGGCATTG
Senegal_ArD101291_1993          TCTAGCACACGTCAACCACAGAGTGCTCTGCCGCTACCCTCCATGAACGCTTTGGCATTG
Germania_V45_2011               TCCAGTACACGTCAACCACAAAGTGCTCTGCCGCTACCCTCCATGAACGCTTTGGCATTG
Germany_V382_2013               TCCAGTACACGTCAACCACAAAGTGCTCTGCCGCTACCCTCCATGAACGCTTTGGCACTG
Vienna_2001                     TCCAGCACACGTCAACCACAAAGTGCTCTGCCGCTACCCTCCATGAACGCTTTGGCATTG
Bologna_2009                    TCCAGCACACGTCAACCACAAAGTGCTCTGCCGCTACCCTCTATGAGCGCTTTGGCATTG
Italia_2009                     TCCAGCACACGTCAACCACAAAGTGCTCTGCCGCTACCCTCTATGAGCGCTTTGGCATTG
Dakar_ArD19848_1974             TCCAGCACACGTCAACCACAGAGTGCTCTGCCGCTACCTTCCATGAACGCTTTGGCATTG
South_Africa_SAAR-1776_2001     TCCGGCACACGTCAACCACAGAGTGCTCTGCCGCTACCTTCCATGAACGCTTTGGCATTG
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Spain_MB119/06_2006,            GATTTGCGACCAGCAACAGCGTGGGCCCTATACGGAGGGAGCACAGTAGTTCTCACGCCC
Dakar_ArD192495,                GATTTGCGACCAGCAACAGCGTGGGCTTTATACGGAGGGAGCACAGTGGTTCTCACGCCC
Senegal_ArD101291_1993          GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGGAGCACAGTGGTTCTCACGCCC
Germania_V45_2011               GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGAAGCACAGTGGTTCTCACGCCC
Germany_V382_2013               GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGAAGCACAGTGGTTCTCACGCCC
Vienna_2001                     GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGGAGCACAGTGGTTCTCACGCCC
Bologna_2009                    GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGGAGCACAGTGGTTCTCACGCCC
Italia_2009                     GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGGAGCACAGTGGTTCTCACGCCC
Dakar_ArD19848_1974             GATTTGCGACCAGCAACAGCGTGGGCCTTATACGGAGGGAGCACAGTAGTTCTCACGCCC
South_Africa_SAAR-1776_2001     GATTTGCGACCAGCAACAGCATGGGCCCTATATGGAGGGAGCACAGTAGTTCTCACGCCC
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Spain_MB119/06_2006,            TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCATCAATAAGCGCT
Dakar_ArD192495,                TTGATCAAACATCTTGTGACATCAGAATACATCACAACATCTCTGGCTTCAATAAGCGCT
Senegal_ArD101291_1993          TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCTTCAATAAGCGCT
Germania_V45_2011               TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCTTCAATAAGCGCT
Germany_V382_2013               TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCTTCAATAAGCGCT
Vienna_2001                     TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCTTCAATAAGCGCT
Bologna_2009                    TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCTTCAATAAGCGCT
Italia_2009                     TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCTTCAATAAGTGCT
Dakar_ArD19848_1974             TTGATCAAACATCTTGTAACATCAGAATACATCACAACATCTCTGGCCTCAATAAGCGCT
South_Africa_SAAR-1776_2001     TTGATCAAACATCTTGTAACATCAGAATACATTACAACATCTCTGGCTTCAATAAGCGCT
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Spain_MB119/06_2006,            CAGGCTGGGTCGTTGTTCACCCTACCCCGCGGACTCCCCTTCACGGAGCTGGACTTGACA
Dakar_ArD192495,                CAGGCTGGGTCTCTGTTCAACCTACCCCGTGGACTCCCCTTCACGGAGCTGGACTTGACA
Senegal_ArD101291_1993          CAGGCTGGGTCTTTGTTCAACCTACCCCGCGGACTCCCCTTCACGGAGCTGGACTTGACA
Germania_V45_2011               CAGGCTGGGTCTTTGTTCAACCTACCTCGTGGACTCCCCTTCACTGAGCTGGACTTGACA
Germany_V382_2013               CAGGCTGGGTCTTTGTTCAACCTACCTCGTGGACTCCCCTTCACTGAGCTGGACTTGACA
Vienna_2001                     CAGGCTGGGTCTTTGTTCAACCTACCCCGCGGACTCCCCTTCACGGAGCTGGACTTTACA
Bologna_2009                    CAGGCTGGGTCTTTGTTCAACCTACCCCGCGGACTCCCCTTCACGGAGCTGGACTTGACA
Italia_2009                     CAGGCTGGGTCTTTGTTCAACCTACCCCGCGGACTCCCCTTCACGGAGCTGGACCTGACA
Dakar_ArD19848_1974             CAGGCTGGGTCTTTGTTCAACCTACCTCGCGGACTCCCCTTCACGGAGCTGGACTTGACA
South_Africa_SAAR-1776_2001     CAGGCTGGGTCTTTGTTCAACCTACCCCGCGGACTCCCCTTCACGGAGCTGGACTTGACA
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Spain_MB119/06_2006,            GTGGTCTTGGTCTTTTTGGGATGCTGGGGCCAGGTGTCGTTAACAACTCTGATTACTGCG
Dakar_ArD192495,                GTGGTCTTGGTCTTTTTGGGATGCTGGGGCCAAGTGTCGTTAACAACTCTGATTACTGCG
Senegal_ArD101291_1993          GTGGTCTTGGTCTTTTTGGGATGCTGGGGCCAAGTGTCGTTAACAACTCTGATTACTGCG
Germania_V45_2011               GTGGTCTTGGTCTTTTTGGGATGTTGGGGCCAAGTGTCGTTAACAACTCTGATCACTGCG
Germany_V382_2013               GTGGTCTTGGTCTTTTTGGGATGTTGGGGCCAAGTGTCGTTAACAACTCTGATCACTGCG
Vienna_2001                     GTGGTCTTGGTCTTTTTGGGATGTTGGGGCCAAGTGTCGTTAACAACTCTGATCACTGCG
Bologna_2009                    GTGGTCTTGGTCTTTTTGGGATGTTGGGGCCAAGTGTCGTTAACAACTCTGATCACTGCG
Italia_2009                     GTGGTCTTGGTCTTTTTGGGATGTTGGGGCCAAGTGTCGTTAACAACTCTGATCACTGCG
Dakar_ArD19848_1974             GTGGTATTGGTCTTTTTGGGATGCTGGGGCCAGGTGTCGTTAACAACTCTGATTACCGCG
South_Africa_SAAR-1776_2001     GTGGTCTTGGTCTTTTTGGGATGCTGGGGCCAGGTGTCGTTAACAACTCTGATCACTGCG
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Spain_MB119/06_2006,            GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Dakar_ArD192495,                GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Senegal_ArD101291_1993          GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Germania_V45_2011               GCAGCTCTGGCTACTCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Germany_V382_2013               GCAGCTCTGGCTACTCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Vienna_2001                     GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Bologna_2009                    GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Italia_2009                     GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
Dakar_ArD19848_1974             GCAGCTCTGGCTACCCTCCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
South_Africa_SAAR-1776_2001     GCAGCTCTGGCCACCCTTCACTATGGCTACATGCTGCCTGGATGGCAGGCTGAAGCTTTG
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Spain_MB119/06_2006,            AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCCGTGGTAGATGGCTTG
Dakar_ArD192495,                AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
Senegal_ArD101291_1993          AGAGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGGCTG
Germania_V45_2011               AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
Germany_V382_2013               AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
Vienna_2001                     AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
Bologna_2009                    AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
Italia_2009                     AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
Dakar_ArD19848_1974             AGGGCGGCTCAACGGAGAACAGCGGCCGGAATCATGAAAAATGCTGTGGTAGATGGTTTG
South_Africa_SAAR-1776_2001     AGGGCGGCTCAACGGAGAACAGCGGCTGGAATCATGAAAAATGCTGTGGTAGACGGCTTG
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Spain_MB119/06_2006,            GTGGCTACGGATGTTCCTGAATTGGAGAGAACCACCCCCCTTATGCAAAAGAAGGTAGGC
Dakar_ArD192495,                GTGGCTACGGATGTTCCTGAACTGGAGAGAACCACCCCCCTCATGCAAAAGAAGGTGGGC
Senegal_ArD101291_1993          GTAGCTACGGATGTTCCTGAACTGGAGAGAACCACCCCCCTCATGCAAAAGAAGGTAGGC
Germania_V45_2011               GTGGCTACGGATGTTCCTGAGCTGGAGAGAACCACCCCCCTCATGCAAAGAAAGGTGGGC
Germany_V382_2013               GTGGCTACGGATGTTCCTGAGCTGGAGAGAACCACCCCCCTCATGCAAAGAAAGGTAGGC
Vienna_2001                     GTGGCTACGGATGTTCCTGAACTGGAGAGAACCACCCCCCTCATGCAAAAGAAGGTAGGC
Bologna_2009                    GTGGCTACGGATGTTCCTGAACTGGAGAGAACCACCCCCCTCATGCAAAAGAAGGTAGGC
Italia_2009                     GTGGCTACGGATGTTCCTGAACTGGAGAGAACCACCCCCCTCATGCAAAAGAAGGTAGGC
Dakar_ArD19848_1974             GTGGCTACGGACGTTCCTGAACTGGAGAGAACCACCCCCCTTATGCAAAAGAAGGTAGGC
South_Africa_SAAR-1776_2001     GTGGCTACGGATGTTCCTGAATTGGAGAGAACCACCCCCCTTATGCAAAAGAAGGTAGGC
                                ** ******** ********  ******************* *******  ***** ***

Spain_MB119/06_2006,            CAGATTTTACTGATTGGGGTCAGCGCGGCGGCATTGTTAGTTAACCCGTGTGTTACAACA
Dakar_ArD192495,                CAGATTCTACTGATTGGGGTCAGCGCGGCGGCATTGTTAGTCAACCCGTGTGTCACAACT
Senegal_ArD101291_1993          CAGATTTTACTGGTTGGGGTCAGCGCGGCGGCATTGTTAGTCAACCCGTGTGTTACAACT
Germania_V45_2011               CAGATTTTACTGATTGGAGTCAGCGCGGCGGCATTGTTAGTCAACCCGTGTGTTACAACT
Germany_V382_2013               CAGATTTTACTGATTGGAGTCAGCGCAGCGGCATTGTTAGTCAACCCGTGTGTTACAACT
Vienna_2001                     CAGATTTTACTGATTGGAGTCAGCGCGGCGGCATTGTTAGTCAACCCGTGTGTTACAACT
Bologna_2009                    CAGATTTTACTGATTGGAGTCAGCGCGGCGGCATTGTTAGTCAACCCGTGTGTTACAACT
Italia_2009                     CAGATTTTACTGATTGGAGTCAGCGCGGCGGCATTGTTAGTCAACCCGTGTGTTACAACT
Dakar_ArD19848_1974             CAGATTTTACTGATTGGGGTCAGCGCGGCGGCATTGTTAGTTAACCCGTGTGTTACAACT
South_Africa_SAAR-1776_2001     CAGATTTTACTGATTGGGGTCAGCGCGGCGGCATTGTTAGTTAACCCGTGTGTTACAACC
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Spain_MB119/06_2006,            GTTCGAGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Dakar_ArD192495,                GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Senegal_ArD101291_1993          GTCCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Germania_V45_2011               GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Germany_V382_2013               GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Vienna_2001                     GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Bologna_2009                    GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Italia_2009                     GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
Dakar_ArD19848_1974             GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAATGGAGCC
South_Africa_SAAR-1776_2001     GTTCGGGAAGCCGGCATCCTCATATCAGCGGCACTCCTGACTCTCTGGGACAACGGAGCC
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Spain_MB119/06_2006,            ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
Dakar_ArD192495,                ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGCCACGTCATCCGTGGCAATTGG
Senegal_ArD101291_1993          ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
Germania_V45_2011               ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
Germany_V382_2013               ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGCCACGTCATCCGTGGCAATTGG
Vienna_2001                     ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
Bologna_2009                    ATTGCAGTATGGAATTCCACCACCGCAACCGGACTTTGTCACGTCATCCGTGGCAATTGG
Italia_2009                     ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
Dakar_ArD19848_1974             ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
South_Africa_SAAR-1776_2001     ATTGCAGTATGGAATTCCACCACCGCGACCGGACTTTGTCACGTCATCCGTGGCAATTGG
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Spain_MB119/06_2006,            CTGGCTGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Dakar_ArD192495,                TTGGCCGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Senegal_ArD101291_1993          TTGGCCGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Germania_V45_2011               TTGGCTGGAGCCTCTATAGCTTGGACTTTGATAAAGAATGCTGACAAACCGGCCTGCAAG
Germany_V382_2013               TTGGCTGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Vienna_2001                     TTGGCTGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Bologna_2009                    CTGGCTGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Italia_2009                     TTGGCTGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCGGCCTGCAAA
Dakar_ArD19848_1974             TTGGCTGGAGCCTCTATAGCCTGGACCCTGATTAAGAACGCTGACAAACCGGCCTGCAAA
South_Africa_SAAR-1776_2001     TTGGCTGGAGCCTCTATAGCTTGGACTCTGATAAAGAATGCTGACAAACCAGCCTGCAAA
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Spain_MB119/06_2006,            CGAGGAAGACCAGGAGGAAGAACACTAGGTGAGCAGTGGAAAGAGAAGCTGAATGGGCTC
Dakar_ArD192495,                CGAGGAAGACCAGGAGGAAGGACACTGGGTGAACAATGGAAGGAGAAGCTGAACGGGCTC
Senegal_ArD101291_1993          CGAGGAAGACCAGGAGGTAGGACACTGGGTGAGCAATGGAAGGAGAAGCTGAACGGGCTC
Germania_V45_2011               CGAGGAAGACCAGGAGGAAGGACACTGGGTGAGCAATGGAAGGAGAAGCTAAACGGGCTC
Germany_V382_2013               CGAGGAAGACCAGGAGGAAGGACACTGGGTGAGCAATGGAAGGAGAAGCTAAACGGGCTC
Vienna_2001                     CGAGGAAGACCAGGAGGAAGGACACTGGGTGAGCAATGGAAGGAGAAGCTAAACGGGCTC
Bologna_2009                    CGAGGAAGACCAGGAGGAAGGACACTGGGTGAGCAATGGAAGGAGAAGCTAAACGGGCTC
Italia_2009                     CGAGGAAGACCAGGAGGAAGGACACTGGGTGAGCAATGGAAGGAGAAGCTAAACGGGCTC
Dakar_ArD19848_1974             CGAGGAAGACCAGGAGGAAGGACACTGGGTGAACAGTGGAAGGAGAAGCTGAATGGGCTC
South_Africa_SAAR-1776_2001     CGAGGAAGACCAGGAGGAAGGACACTGGGTGAGCAGTGGAAAGAAAAGCTGAATGGGCTC
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Spain_MB119/06_2006,            AGCAGGGAGGAATTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Dakar_ArD192495,                AGCAAGGAGGATTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTTGACCGTTCCGCA
Senegal_ArD101291_1993          AGCAAGGAGGATTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Germania_V45_2011               AGCAAGGAGGACTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Germany_V382_2013               AGCAAGGAGGACTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Vienna_2001                     AGCAAGGAGGATTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Bologna_2009                    AGCAAGGAGGATTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Italia_2009                     AGCAAGGAGGATTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
Dakar_ArD19848_1974             AGCAGGGAGGATTTCCTGAAGTACAGGAAAGAGGCTATCACTGAAGTCGACCGGTCCGCA
South_Africa_SAAR-1776_2001     AGTAGGGAGGACTTCCTGAAGTACAGGAAAGAGGCCATCACTGAAGTCGACCGGTCCGCA
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Spain_MB119/06_2006,            GCCCGGAAGGCCAGGAGGGACGGGAACAAAACTGGAGGACACCCGGTGTCCAGAGGCTCG
Dakar_ArD192495,                GCCCGAAAAGCTAGGAGGGACGGAAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Senegal_ArD101291_1993          GCCCGAAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Germania_V45_2011               GCCCGAAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Germany_V382_2013               GCCCGAAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Vienna_2001                     GCCCGAAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Bologna_2009                    GCCCGGAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Italia_2009                     GCCCGGAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
Dakar_ArD19848_1974             GCCCGAAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
South_Africa_SAAR-1776_2001     GCCCGAAAAGCTAGGAGGGACGGGAACAAAACTGGAGGACACCCAGTGTCCAGAGGCTCC
                                ***** ** ** *********** ******************** **************

Spain_MB119/06_2006,            GCAAAGCTGAGATGGATGGTAGAACGCCAATTCGTCAAACCAATTGGCAAGGTGGTTGAC
Dakar_ArD192495,                GCAAAGCTGAGATGGATGGTAGAACGCCAATTTGTCAAGCCAATTGGCAAGGTGGTTGAC
Senegal_ArD101291_1993          GCAAAGCTGAGATGGATGGTAGAACGCCAATTCGTCAAACCAATTGGCAAGGTGGTTGAC
Germania_V45_2011               GCAAAGCTGAGATGGATGGTAGAACGCCAATTTGTCAAACCAATTGGCAAGGTGGTTGAC
Germany_V382_2013               GCAAAGCTGAGATGGATGGTAGAACGCCAATTTGTCAAACCAATTGGCAAGGTGGTTGAC
Vienna_2001                     GCAAAGCTGAGATGGATGGTAGAACGCCAATTTGTCAAACCAATTGGCAAGGTGGTTGAC
Bologna_2009                    GCAAAGCTGAGATGGATGGTAGAACGCCAATTTGTCAAACCAATTGGCAAGGTGGTTGAC
Italia_2009                     GCAAAGCTGAGATGGATGGTAGAACGCCAATTTGTCAAACCAATTGGCAAGGTGGTTGAC
Dakar_ArD19848_1974             GCAAAGCTGAGATGGATGGTAGAACGCCAATTCGTCAAACCAATTGGCAAGGTGGTTGAC
South_Africa_SAAR-1776_2001     GCAAAGCTGAGATGGATGGTAGAACGCCAATTCGTCAAACCAATTGGCAAGGTGGTTGAC
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Spain_MB119/06_2006,            CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Dakar_ArD192495,                CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Senegal_ArD101291_1993          CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Germania_V45_2011               CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Germany_V382_2013               CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Vienna_2001                     CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Bologna_2009                    CTAGGTTGTGGGCGAGGAGGGTGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Italia_2009                     CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACGCTCAAAGGCGTCCAAGAA
Dakar_ArD19848_1974             CTAGGTTGTGGGCGAGGAGGATGGAGTTATTATGCAGCCACGCTCAAAGGCGTCCAAGAA
South_Africa_SAAR-1776_2001     CTAGGTTGTGGGCGAGGAGGATGGAGTTACTATGCAGCCACACTCAAAGGCGTCCAAGAA
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Spain_MB119/06_2006,            GTCAGAGGCTACACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAGAGCTAT
Dakar_ArD192495,                GTCAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAAAGCTAT
Senegal_ArD101291_1993          GTCAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAAAGCTAT
Germania_V45_2011               GTCAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAAAGCTAT
Germany_V382_2013               GTCAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAAAGCTAT
Vienna_2001                     GTCAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAAAGCTAT
Bologna_2009                    GTCAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATACAAAGCTAT
Italia_2009                     GTCAGAGGCTATACGAAAGGAGGACCTGGACACGAGGAACCGATGCTTATACAAAGCTAT
Dakar_ArD19848_1974             GTCAGAGGCTACACGAAAGGAGGACCTGGACATGAGGAACCGATGCTAATGCAAAGCTAT
South_Africa_SAAR-1776_2001     GTTAGAGGCTATACGAAAGGAGGACCTGGACATGAGGAACCGATGCTTATGCAAAGCTAT
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Spain_MB119/06_2006,            GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAACCG
Dakar_ArD192495,                GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTGTTATAAACCATCTGAGCCG
Senegal_ArD101291_1993          GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
Germania_V45_2011               GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
Germany_V382_2013               GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
Vienna_2001                     GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
Bologna_2009                    GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
Italia_2009                     GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
Dakar_ArD19848_1974             GGTTGGAACCTCGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
South_Africa_SAAR-1776_2001     GGCTGGAACCTTGTCACTATGAAGAGCGGAGTGGACGTGTATTATAAACCATCTGAGCCG
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Spain_MB119/06_2006,            TGCGACACGCTTTTTTGTGACATTGGGGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Dakar_ArD192495,                TGCGACACGCTTTTTTGTGACATTGGAGAATCATCCTCCAGTGCTGAGGTGGAAGAACAA
Senegal_ArD101291_1993          TGCGACACGCTTTTTTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Germania_V45_2011               TGCGACACGCTTTTCTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Germany_V382_2013               TGCGACACGCTTTTCTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Vienna_2001                     TGCGACACGCTTTTCTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Bologna_2009                    TGCGACACGCTTTTCTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Italia_2009                     TGCGACACGCTTTTCTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
Dakar_ArD19848_1974             TGCGACACGCTTTTTTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
South_Africa_SAAR-1776_2001     TGCGACACGCTTTTTTGTGACATTGGAGAATCATCTTCTAGTGCTGAGGTGGAAGAACAA
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Spain_MB119/06_2006,            CGCACTCTGAGGATTTTGGACATGGTCTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Dakar_ArD192495,                CGCACTCTGAGGATCTTGGAAATGGTCTCTGACTGGCTGCAGAGAGGACCAAGAGAGTTC
Senegal_ArD101291_1993          CGCACTCTGAGGATTTTGGAAATGGTCTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Germania_V45_2011               CGCACTCTGAGGATTTTGGAAATGGTCTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Germany_V382_2013               CGCACTCTGAGGATTTTGGAAATGGTCTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Vienna_2001                     CGCACCCTGAGGATTTTGGAAATGGTTTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Bologna_2009                    CGCACTCTGAGGATTTTGGAAATGGTTTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Italia_2009                     CGCACTCTGAGGATTTTGGAAATGGTTTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
Dakar_ArD19848_1974             CGCACTCTGAGGATTCTGGAAATGGTCTCTGATTGGCTGCAGAGAGGACCAAAAGAGTTT
South_Africa_SAAR-1776_2001     CGCACTCTGAGGATTTTGGAAATGGTCTCTGATTGGCTGCAGAGAGGACCAAGAGAGTTC
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Spain_MB119/06_2006,            TGTATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTAGAAGTTCTACAA
Dakar_ArD192495,                TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Senegal_ArD101291_1993          TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Germania_V45_2011               TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Germany_V382_2013               TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Vienna_2001                     TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Bologna_2009                    TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Italia_2009                     TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTGGAAGTTCTACAA
Dakar_ArD19848_1974             TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTAGAAGTTCTACAA
South_Africa_SAAR-1776_2001     TGCATCAAGGTTCTCTGCCCATACATGCCACGTGTCATGGAGCGCTTAGAAGTTCTACAA
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Spain_MB119/06_2006,            CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Dakar_ArD192495,                CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Senegal_ArD101291_1993          CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Germania_V45_2011               CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Germany_V382_2013               CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Vienna_2001                     CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Bologna_2009                    CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Italia_2009                     CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
Dakar_ArD19848_1974             CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
South_Africa_SAAR-1776_2001     CGGAGGTATGGAGGAGGATTGGTTCGAGTCCCTCTTTCCAGAAATTCCAACCATGAGATG
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Spain_MB119/06_2006,            TACTGGGTCAGTGGAGCTGCTGGCAACATTGTTCACGCAGTGAACATGACGAGTCAAGTG
Dakar_ArD192495,                TACTGGGTCAGTGGGGCTGCTGGCAACATTGTTCACGCAGTGAACATGACGAGTCAAGTG
Senegal_ArD101291_1993          TACTGGGTCAGTGGAGCTGCTGGCAACATTGTTCACGCAGTGAACATGACGAGTCAAGTG
Germania_V45_2011               TACTGGGTCAGTGGAGCTGCTGGCAACATTGTCCACGCAGTGAACATGACGAGTCAAGTG
Germany_V382_2013               TACTGGGTCAGTGGAGCTGCTGGCAACATTGTCCACGCAGTGAACATGACGAGTCAAGTG
Vienna_2001                     TACTGGGTCAGTGGAGCTGCTGGCAACATTGTCCACGCAGTGAACATGACGAGTCAAGTG
Bologna_2009                    TACTGGGTCAGTGGAGCTGCTGGCAACATTGTCCACGCAGTGAACATGACGAGTCAAGTG
Italia_2009                     TACTGGGTCAGTGGAGCTGCTGGCAACATTGTCCACGCAGTGAACATGACGAGTCAAGTG
Dakar_ArD19848_1974             TACTGGGTCAGTGGAGCTGCTGGCAACATTGTTCACGCAGTGAACATGACGAGTCAAGTG
South_Africa_SAAR-1776_2001     TACTGGGTTAGTGGAGCTGCTGGCAACATTGTTCACGCAGTGAACATGACGAGTCAAGTG
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Spain_MB119/06_2006,            CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
Dakar_ArD192495,                CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGGCCAAAATACGAGGAGGATGTTAAC
Senegal_ArD101291_1993          CTCATAGGGCGTATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
Germania_V45_2011               CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
Germany_V382_2013               CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
Vienna_2001                     CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
Bologna_2009                    CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
Italia_2009                     CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGACGTTAAC
Dakar_ArD19848_1974             CTCATAGGGCGAATGGAGAAGAGAGCATGGCATGGACCAAAATACGAGGAGGATGTCAAC
South_Africa_SAAR-1776_2001     CTCATAGGGCGAATGGAGAAGAGAACATGGCATGGACCAAAATACGAGGAGGATGTTAAC
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Spain_MB119/06_2006,            CTTGGAAGTGGAACAAGAGCTGTCGGGAAGCCCCAGCCACATGCCAATCAGGAGAAGATT
Dakar_ArD192495,                CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATGCCAACCAAGAGAAGATT
Senegal_ArD101291_1993          CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATACCAACCAGGAGAAGATT
Germania_V45_2011               CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATACCAACCAGGAGAAGATT
Germany_V382_2013               CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATACCAACCAGGAGAAGATT
Vienna_2001                     CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATACCAACCAGGAGAAGATT
Bologna_2009                    CTTGGAAGTGGAACAAGAGCCGTTGGGAAACCCCAGCCACATACCAACCAGGAGAAGATT
Italia_2009                     CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATACCAACCAGGAGAAGATT
Dakar_ArD19848_1974             CTTGGAAGTGGAACAAGAGCCGTTGGGAAGCCCCAGCCACATGCCAACCAGGAGAAGATC
South_Africa_SAAR-1776_2001     CTTGGAAGTGGAACAAGAGCCGTCGGGAAGCCCCAGCCACATGCCAACCAGGAGAAGATC
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Spain_MB119/06_2006,            AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
Dakar_ArD192495,                AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
Senegal_ArD101291_1993          AAAGCCAGGATTCAAAGACTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
Germania_V45_2011               AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
Germany_V382_2013               AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
Vienna_2001                     AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
Bologna_2009                    AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCACGATAAGGAC
Italia_2009                     AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCACGACAAGGAC
Dakar_ArD19848_1974             AAAGCCAGGATTCAAAGATTGAAAGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
South_Africa_SAAR-1776_2001     AAAGCCAGGATTCAAAGATTGAAGGAGGAGTATGCAGCCACATGGCACCATGACAAGGAC
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Spain_MB119/06_2006,            CACCCATATCGGACTTGGACCTACCACGGGAGCTATGAAGTGAAACCGACCGGTTCAGCA
Dakar_ArD192495,                CACCCATATCGGACTTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Senegal_ArD101291_1993          CACCCATATCGGACCTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Germania_V45_2011               CACCCATATCGGACCTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Germany_V382_2013               CACCCATATCGGACCTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Vienna_2001                     CACCCATATCGGACCTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Bologna_2009                    CACCCATATCGGACCTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Italia_2009                     CACCCATATCGGACTTGGACCTACCACGGAAGTTATGAAGTGAAACCGACCGGTTCAGCA
Dakar_ArD19848_1974             CACCCATACCGGACTTGGACCTACCACGGAAGCTATGAAGTGAAACCGACCGGTTCAGCA
South_Africa_SAAR-1776_2001     CACCCATATCGGACTTGGACCTACCACGGAAGCTATGAAGTGAAACCGACCGGTTCAGCA
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Spain_MB119/06_2006,            AGCTCCTTGGTCAACGGAGTCGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAT
Dakar_ArD192495,                AGCTCCTTGGTCAACGGAGTCGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Senegal_ArD101291_1993          AGCTCCTTGGTCAACGGAGTCGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Germania_V45_2011               AGCTCCTTGGTCAACGGAGTCGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Germany_V382_2013               AGCTCCTTGGTCAACGGAGTCGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Vienna_2001                     AGCTCCTTGGTCAACGGAGTTGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Bologna_2009                    AGCTCCTTGGTCAACGGAGTTGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Italia_2009                     AGCTCCTTGGTCAACGGAGTTGTCCGCCTAATGAGCAAGCCCTGGGATGCAATTCTCAAC
Dakar_ArD19848_1974             AGCTCCTTGGTCAACGGAGTCGTCCGCTTAATGAGCAAGCCCTGGGATGCAATTCTTAAT
South_Africa_SAAR-1776_2001     GGCTCCTTGGTCAACGGAGTCGTTCGCCTAATGAGCAAGCCTTGGGATGCAATTCTTAAC
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Spain_MB119/06_2006,            GTGACCACTATGGCGATGACTGACACCACTCCATTCGGGCAGCAGAGGGTCTTCAAAGAG
Dakar_ArD192495,                GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
Senegal_ArD101291_1993          GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
Germania_V45_2011               GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAAAGGGTTTTCAAAGAA
Germany_V382_2013               GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAAAGGGTTTTCAAAGAA
Vienna_2001                     GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
Bologna_2009                    GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
Italia_2009                     GTGACCACCATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
Dakar_ArD19848_1974             GTGACCACTATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
South_Africa_SAAR-1776_2001     GTGACCACTATGGCGATGACTGACACCACTCCGTTTGGGCAGCAGAGGGTTTTCAAAGAA
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Spain_MB119/06_2006,            AAGGTTGATACCAAGGCCCCAGAACCCCCTTCTGGAGTTAAAGAGGTGATGGATGAGACC
Dakar_ArD192495,                AAGGTTGACACCAAGGCCCCAGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Senegal_ArD101291_1993          AAGGTTGACACCAAGGCCCCAGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Germania_V45_2011               AAGGTTGACACCAAGGCCCCGGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Germany_V382_2013               AAGGTTGACACCAAGGCCCCGGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Vienna_2001                     AAGGTTGACACCAAGGCCCCGGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Bologna_2009                    AAGGTTGACACCAAGGCCCCGGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Italia_2009                     AAGGTTGACACCAAGGCCCCGGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
Dakar_ArD19848_1974             AAGGTTGACACCAAGGCTCCAGAACCCCCTTCTGGAGTTAGAGAGGTGATGGATGAGACC
South_Africa_SAAR-1776_2001     AAGGTTGACACCAAGGCTCCAGAACCCCCTTCTGGAGTTAGAGAAGTGATGGATGAGACC
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Spain_MB119/06_2006,            ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
Dakar_ArD192495,                ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTATGCACCAGGGAA
Senegal_ArD101291_1993          ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
Germania_V45_2011               ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGCTGTGCACCAGGGAA
Germany_V382_2013               ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGCTGTGCACCAGGGAA
Vienna_2001                     ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
Bologna_2009                    ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
Italia_2009                     ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
Dakar_ArD19848_1974             ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
South_Africa_SAAR-1776_2001     ACCAATTGGCTGTGGGCTTTTCTCGCACGAGAAAAGAAGCCAAGGTTGTGCACCAGGGAA
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Spain_MB119/06_2006,            GAGTTCAAGAGGAAGGTCAACAGCAACGCTGCTTTGGGTGCCATGTTTGAAGAGCAGAAC
Dakar_ArD192495,                GAGTTTAAGAGGAAGGTCAACAGCAACGCCGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
Senegal_ArD101291_1993          GAGTTTAAGAGGAAGGTCAACAGCAACGCTGCTCTGGGAGCCATGTTTGAAGAGCAGAAC
Germania_V45_2011               GAGTTTAAGAGGAAGGTCAACAGCAACGCTGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
Germany_V382_2013               GAGTTTAAGAGGAAGGTCAACAGCAACGCTGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
Vienna_2001                     GAGTTTAAGAGGAAGGTCAACAGCAACGCTGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
Bologna_2009                    GAGTTCAAGAGGAAGGTCAACAGCAACGCCGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
Italia_2009                     GAGTTTAAGAGGAAGGTCAACAGCAACGCCGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
Dakar_ArD19848_1974             GAGTTTAAGAGGAAGGTCAACAGCAACGCTGCTTTGGGAGCCATGTTTGAAGAGCAGAAC
South_Africa_SAAR-1776_2001     GAGTTTAAGAGGAAGGTCAACAGCAACGCTGCTTTGGGAGCCATGTTTGAGGAGCAGAAC
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Spain_MB119/06_2006,            CAATGGAGCAGTGCTAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGATGAA
Dakar_ArD192495,                CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCCCGGTTCTGGGAAATGGTGGACGAG
Senegal_ArD101291_1993          CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
Germania_V45_2011               CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
Germany_V382_2013               CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
Vienna_2001                     CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
Bologna_2009                    CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
Italia_2009                     CAATGGAGCAGTGCCAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
Dakar_ArD19848_1974             CAATGGAGCAGTGCTAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
South_Africa_SAAR-1776_2001     CAATGGAGCAGTGCTAGGGAGGCTGTAGAGGACCCTCGGTTCTGGGAAATGGTGGACGAA
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Spain_MB119/06_2006,            GAAAGGGAGAACCATTTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Dakar_ArD192495,                GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Senegal_ArD101291_1993          GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Germania_V45_2011               GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Germany_V382_2013               GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Vienna_2001                     GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Bologna_2009                    GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Italia_2009                     GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
Dakar_ArD19848_1974             GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
South_Africa_SAAR-1776_2001     GAAAGGGAGAACCATCTGAAAGGAGAGTGCCACACATGCATTTACAACATGATGGGGAAG
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Spain_MB119/06_2006,            CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGCAGTCGAGCCATATGGTTTATG
Dakar_ArD192495,                CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGCAGTCGAGCCATATGGTTCATG
Senegal_ArD101291_1993          CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCAAAGGGCAGTCGAGCCATATGGTTCATG
Germania_V45_2011               CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGTAGTCGAGCCATATGGTTCATG
Germany_V382_2013               CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGTAGTCGAGCCATATGGTTCATG
Vienna_2001                     CGTGAGAAGAAGCTCGGAGAGTTTGGTAAAGCGAAAGGTAGTCGAGCCATATGGTTCATG
Bologna_2009                    CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGTAGTCGAGCCATATGGTTCATG
Italia_2009                     CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGTAGTCGAGCCATATGGTTCATG
Dakar_ArD19848_1974             CGTGAGAAGAAGCTCGGAGAGTTTGGCAAGGCGAAAGGCAGTCGAGCCATATGGTTCATG
South_Africa_SAAR-1776_2001     CGTGAGAAGAAGCTCGGAGAGTTTGGCAAAGCGAAAGGCAGTCGAGCCATATGGTTCATG
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Spain_MB119/06_2006,            TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCTTGGGCTTTCTGAACGAGGACCATTGG
Dakar_ArD192495,                TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCCTGGGCTTTCTGAATGAGGACCATTGG
Senegal_ArD101291_1993          TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCCTGGGCTTTTTGAATGAGGACCATTGG
Germania_V45_2011               TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCCTGGGCTTTCTGAATGAGGACCATTGG
Germany_V382_2013               TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCCTGGGCTTTCTGAATGAGGACCATTGG
Vienna_2001                     TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCTCTGGGCTTTCTGAATGAGGACCATTGG
Bologna_2009                    TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCTCTGGGCTTTCTGAATGAGGACCATTGG
Italia_2009                     TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCTCTGGGCTTTCTGAATGAGGACCATTGG
Dakar_ArD19848_1974             TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCCTGGGCTTTCTGAATGAGGACCATTGG
South_Africa_SAAR-1776_2001     TGGCTAGGCGCCAGATTCCTGGAGTTTGAAGCCCTGGGCTTTCTGAATGAGGACCATTGG
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Spain_MB119/06_2006,            TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGGCTTGGTGTCCAAAAGCTTGGTTAC
Dakar_ArD192495,                TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGGCTTGGTGTCCAAAAACTTGGTTAC
Senegal_ArD101291_1993          TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGGCTTGGTGTCCAAAAACTTGGTTAC
Germania_V45_2011               TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAACTTGGCTAC
Germany_V382_2013               TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAACTTGGCTAC
Vienna_2001                     TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAACTTGGTTAC
Bologna_2009                    TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAACTTGGTTAC
Italia_2009                     TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAACTTGGTTAC
Dakar_ArD19848_1974             CTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAGCTTGGTTAC
South_Africa_SAAR-1776_2001     TTAGGAAGAAAGAATTCTGGAGGAGGTGTTGAAGGACTTGGTGTCCAAAAGCTTGGTTAC
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Spain_MB119/06_2006,            ATTCTGCGGGAAATGAGCTACCACTCAGGTGGGAAAATGTACGCAGATGACACGGCCGGC
Dakar_ArD192495,                ATTCTGCGTGAGATGAGTCACCATTCAGGTGGGAAAATGTACGCGGATGACACAGCCGGT
Senegal_ArD101291_1993          ATTCTGCGTGAGATGAGCCACCATTCAGGTGGGAAAATGTACGCGGATGATACAGCCGGC
Germania_V45_2011               ATTCTGCGTGAGATGAGCCACCACTCAGGTGGAAAAATGTACGCGGATGACACAGCCGGC
Germany_V382_2013               ATTCTGCGTGAGATGAGCCACCACTCAGGTGGAAAAATGTACGCGGATGACACAGCCGGC
Vienna_2001                     ATTCTGCGTGAGATGAGCCACCATTCAGGTGGAAAAATGTACGCGGATGACACAGCCGGC
Bologna_2009                    ATTCTGCGTGAGATGAGCCACCATTCAGGTGGGAAAATGTACGCGGATGACACAGCCGGC
Italia_2009                     ATTCTGCGTGAGATGAGCCACCATTCAGGTGGGAAAATGTACGCGGATGACACAGCCGGC
Dakar_ArD19848_1974             ATTCTGCGTGAGATGAGCCACCACTCAGGTGGGAAAATGTACGCAGATGACACAGCCGGC
South_Africa_SAAR-1776_2001     ATTCTGCGGGAGATGAGCCACCACTCAGGTGGGAAAATGTACGCAGATGACACGGCCGGC
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Spain_MB119/06_2006,            TGGGACACCCGGATAACCAGAGCTGATCTTGACAACGAGGCCAAGGTTTTAGAGCTGATG
Dakar_ArD192495,                TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Senegal_ArD101291_1993          TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Germania_V45_2011               TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Germany_V382_2013               TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Vienna_2001                     TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Bologna_2009                    TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Italia_2009                     TGGGACACCCGGATAACCAGAGCCGATCTTGACAACGAGGCCAAAGTTTTGGAGCTGATG
Dakar_ArD19848_1974             TGGGACACCCGGATAACCAGAGCTGATCTTGACAATGAGGCCAAAGTTTTGGAGCTGATG
South_Africa_SAAR-1776_2001     TGGGACACCCGGATAACCAGAGCTGATCTTGACAACGAGGCCAAGGTTTTGGAGCTGATG
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Spain_MB119/06_2006,            GAAGGTGAGCACAGACAACTGGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Dakar_ArD192495,                GAAGGTGAGCACAGACAACTGGCTAGAGCAATCATTGAGCTGACCTACAAACACAAAGTG
Senegal_ArD101291_1993          GAAGGTGAGCACAGACAACTGGCTAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Germania_V45_2011               GAAGGTGAGCACAGACAACTAGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Germany_V382_2013               GAAGGTGAGCACAGACAACTAGCAAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Vienna_2001                     GAAGGTGAGCACAGACAACTAGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Bologna_2009                    GAAGGTGAGCACAGACAACTAGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Italia_2009                     GAAGGTGAGCACAGACAACTAGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
Dakar_ArD19848_1974             GAAGGCGAGCACAGACAACTAGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
South_Africa_SAAR-1776_2001     GAAGGTGAGCACAGACAACTGGCCAGAGCAATCATTGAGCTGACCTACAAACACAAGGTG
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Spain_MB119/06_2006,            GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATCTCCCGAGAA
Dakar_ArD192495,                GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Senegal_ArD101291_1993          GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Germania_V45_2011               GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Germany_V382_2013               GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Vienna_2001                     GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Bologna_2009                    GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Italia_2009                     GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
Dakar_ArD19848_1974             GTGAAAGTTATGCGACCTGGCACTGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
South_Africa_SAAR-1776_2001     GTGAAAGTTATGCGACCTGGCACAGATGGGAAGACCGTCATGGATGTGATTTCCCGAGAA
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Spain_MB119/06_2006,            GACCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCT
Dakar_ArD192495,                GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
Senegal_ArD101291_1993          GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATCGCC
Germania_V45_2011               GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
Germany_V382_2013               GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
Vienna_2001                     GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
Bologna_2009                    GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
Italia_2009                     GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
Dakar_ArD19848_1974             GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
South_Africa_SAAR-1776_2001     GATCAGAGAGGAAGTGGACAGGTTGTGACCTATGCTCTCAACACATTCACCAACATTGCC
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Spain_MB119/06_2006,            GTCCAGCTCATCAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATTTGGAAAGT
Dakar_ArD192495,                GTCCAGCTTATCAGACTGATGGAAGCTGAAGGAGTGATAGGGCAGGAACATCTGGAAAGT
Senegal_ArD101291_1993          GTCCAGCTTATCAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
Germania_V45_2011               GTCCAGCTCATTAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
Germany_V382_2013               GTCCAGCTCATTAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
Vienna_2001                     GTCCAGCTTATTAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
Bologna_2009                    GTCCAGCTTATTAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
Italia_2009                     GTCCAGCTTATTAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
Dakar_ArD19848_1974             GTCCAGCTCATCAGACTAATGGAAGCTGAAGGAGTGATTGGGCAGGAACATCTGGAAAGT
South_Africa_SAAR-1776_2001     GTCCAGCTCATCAGACTGATGGAAGCTGAAGGAGTGATTGGGCAGGAACATTTGGAAAGT
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Spain_MB119/06_2006,            CTTCCCCGGAAAACTAAATACGCTGTAAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGA
Dakar_ArD192495,                CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
Senegal_ArD101291_1993          CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
Germania_V45_2011               CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
Germany_V382_2013               CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
Vienna_2001                     CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
Bologna_2009                    CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
Italia_2009                     CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTTTTTGAGAACGGAGAAGAAAGG
Dakar_ArD19848_1974             CTTCCCCGGAAGACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
South_Africa_SAAR-1776_2001     CTTCCCCGGAAAACCAAATACGCTGTGAGAACCTGGCTCTTTGAGAACGGAGAAGAAAGG
                                *********** ** *********** *********** ********************

Spain_MB119/06_2006,            GTAACCCGTATGGCTGTGAGTGGAGATGATTGCGTTGTCAAGCCCCTGGATGATCGGTTT
Dakar_ArD192495,                GTGACCCGCATGGCCGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
Senegal_ArD101291_1993          GTGACCCGCATGGCTGTGAGTGGAGATGATTGTGTTGTTAAGCCCCTGGATGATCGGTTT
Germania_V45_2011               GTGACCCGTATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
Germany_V382_2013               GTGACCCGTATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
Vienna_2001                     GTGACCCGCATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
Bologna_2009                    GTGACCCGCATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
Italia_2009                     GTGACCCGCATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
Dakar_ArD19848_1974             GTAACCCGCATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
South_Africa_SAAR-1776_2001     GTAACCCGCATGGCTGTGAGTGGAGATGATTGTGTTGTCAAGCCCCTGGATGATCGGTTT
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Spain_MB119/06_2006,            GCCAATGCCCTGCACTTTCTCAATTCGATGTCTAAGGTCAGAAAAGACGTGCCAGAGTGG
Dakar_ArD192495,                GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGATGTGCCAGAGTGG
Senegal_ArD101291_1993          GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGACGTGCCAGAGTGG
Germania_V45_2011               GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGACGTGCCAGAGTGG
Germany_V382_2013               GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGACGTGCCAGAGTGG
Vienna_2001                     GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGACGTGCCAGAGTGG
Bologna_2009                    GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGACGTGCCAGAGTGG
Italia_2009                     GCCAATGCCCTGCACTTTCTCAATTCGATGTCCAAGGTCAGAAAAGACGTGCCAGAGTGG
Dakar_ArD19848_1974             GCCAATGCCCTGCATTTTCTCAATTCGATGTCTAAGGTCAGAAAAGACGTGCCAGAGTGG
South_Africa_SAAR-1776_2001     GCCAATGCCCTGCACTTTCTCAATTCGATGTCTAAGGTCAGAAAAGACGTGCCAGAGTGG
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Spain_MB119/06_2006,            AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Dakar_ArD192495,                AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTCCAG
Senegal_ArD101291_1993          AAACCCTCCTCGGGATGGCACGACTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Germania_V45_2011               AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Germany_V382_2013               AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Vienna_2001                     AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Bologna_2009                    AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Italia_2009                     AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCACTTTCAG
Dakar_ArD19848_1974             AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCTTTCTGCTCAAACCATTTTCAG
South_Africa_SAAR-1776_2001     AAACCCTCCTCGGGATGGCACGATTGGCAGCAAGTGCCCTTCTGCTCAAACCATTTTCAG
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Spain_MB119/06_2006,            GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCCTGCCGAGGCCAGGATGAACTC
Dakar_ArD192495,                GAATTGATCATGAAGGACGGAAGAACTTTGGTGGTTCCCTGCCGGGGTCAGGATGAACTC
Senegal_ArD101291_1993          GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCTTGCCGGGGTCAGGATGAACTC
Germania_V45_2011               GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCCTGCCGGGGTCAGGATGAACTC
Germany_V382_2013               GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCCTGCCGGGGTCAGGATGAACTC
Vienna_2001                     GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCCTGCCGGGGTCAGGATGAACTC
Bologna_2009                    GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCCTGCCGGGGTCAGGATGAACTC
Italia_2009                     GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCCTGCCGGGGTCAGGATGAACTC
Dakar_ArD19848_1974             GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCTTGCCGGGGTCAGGATGAACTC
South_Africa_SAAR-1776_2001     GAATTGATCATGAAGGACGGAAGGACTTTGGTGGTTCCTTGCCGAGGTCAGGATGAACTC
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Spain_MB119/06_2006,            ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Dakar_ArD192495,                ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Senegal_ArD101291_1993          ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTCCGGGACACCGCATGCTTG
Germania_V45_2011               ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Germany_V382_2013               ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Vienna_2001                     ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Bologna_2009                    ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Italia_2009                     ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGCTTG
Dakar_ArD19848_1974             ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGATGGAATGTTAGGGACACCGCATGTTTG
South_Africa_SAAR-1776_2001     ATTGGGAGGGCGCGAGTCTCCCCCGGCTCTGGGTGGAATGTTAGGGACACTGCATGCTTG
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Spain_MB119/06_2006,            GCCAAGGCCTACGCTCAGATGTGGCTCCTGTTGTACTTCCACAGAAGAGATCTGAGGCTG
Dakar_ArD192495,                GCCAAGGCCTACGCTCAGATGTGGCTCTTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Senegal_ArD101291_1993          GCCAAGGCCTACGCTCAGATGTGGCTCTTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Germania_V45_2011               GCCAAGGCCTACGCTCAGATGTGGCTCCTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Germany_V382_2013               GCCAAGGCCTACGCTCAGATGTGGCTCCTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Vienna_2001                     GCCAAGGCCTACGCTCAGATGTGGCTCCTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Bologna_2009                    GCCAAGGCCTACGCTCAGATGTGGCTCCTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Italia_2009                     GCCAAGGCCTACGCTCAGATGTGGCTCCTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
Dakar_ArD19848_1974             GCCAAGGCTTACGCTCAGATGTGGCTCTTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
South_Africa_SAAR-1776_2001     GCTAAGGCCTACGCCCAGATGTGGCTCTTGCTGTACTTCCACAGAAGAGATCTGAGGCTG
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Spain_MB119/06_2006,            ATGGCAAACGCCATCTGCTCAGCAGTCCCTAGCAATTGGATCCCCACTGGCAGGACATCA
Dakar_ArD192495,                ATGGCAAATGCCATCTGCTCAGCAGTCCCTAGCAATTGGGTTCCCACTGGCAGGACTTCA
Senegal_ArD101291_1993          ATGGCAAACGCCATCTGCTCAGCAGTCCCCAGCAATTGGGTTCCCACTGGCAGGACTTCA
Germania_V45_2011               ATGGCAAACGCCATCTGTTCAGCAGTCCCCAGCAATTGGGTTCCCACTGGCAGGACTTCA
Germany_V382_2013               ATGGCAAACGCCATCTGTTCAGCAGTCCCCAGCAACTGGGTTCCCACTGGCAGGACTTCA
Vienna_2001                     ATGGCAAACGCCATCTGTTCAGCAGTCCCCAGCAATTGGGTTCCCACTGGCAGGACTTCA
Bologna_2009                    ATGGCAAACGCCATCTGTTCAGCAGTCCCCAGCAATTGGGTTCCCACTGGCAGGACTTCA
Italia_2009                     ATGGCAAACGCCATCTGTTCAGCAGTCCCCAGCAATTGGGTTCCCACTGGCAGGACTTCA
Dakar_ArD19848_1974             ATGGCAAACGCCATCTGCTCAGCAGTTCCCAGCAATTGGGTTCCCACTGGCAGGACTTCA
South_Africa_SAAR-1776_2001     ATGGCAAACGCCATCTGCTCAGCAGTCCCCAGCAATTGGGTTCCCACTGGCAGGACGTCA
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Spain_MB119/06_2006,            TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Dakar_ArD192495,                TGGTCAGTGCATGCCACAGGAGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Senegal_ArD101291_1993          TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Germania_V45_2011               TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Germany_V382_2013               TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Vienna_2001                     TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Bologna_2009                    TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Italia_2009                     TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
Dakar_ArD19848_1974             TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
South_Africa_SAAR-1776_2001     TGGTCAGTGCATGCCACAGGTGAATGGATGACAACTGATGACATGTTGGAAGTGTGGAAC
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Spain_MB119/06_2006,            AAAGTGTGGATTCAAGACAATGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Dakar_ArD192495,                AAAGTGTGGATTCAAGACAATGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Senegal_ArD101291_1993          AAAGTGTGGATTCAAGACAACGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Germania_V45_2011               AAAGTGTGGATCCAAGACAACGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Germany_V382_2013               AAAGTGTGGATCCAAGACAACGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Vienna_2001                     AAAGTGTGGATCCAAGACAACGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Bologna_2009                    AAAGTGTGGATCCAAGACAATGAATGGATGCTGGACAAGACCCCAGTTCAAAGCTGGACA
Italia_2009                     AAAGTGTGGATCCAAGACAATGAATGGATGCTGGACAAGACCCTAGTTCAAAGCTGGACA
Dakar_ArD19848_1974             AAAGTGTGGATTCAAGACAATGAATGGATGCTGGACAAGACCCCAGTCCAAAGCTGGACA
South_Africa_SAAR-1776_2001     AAAGTGTGGATTCAAGACAATGAATGGATGCTGGACAAAACCCCAGTTCAAAGCTGGACA
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Spain_MB119/06_2006,            GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Dakar_ArD192495,                GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Senegal_ArD101291_1993          GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Germania_V45_2011               GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Germany_V382_2013               GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Vienna_2001                     GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Bologna_2009                    GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Italia_2009                     GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
Dakar_ArD19848_1974             GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
South_Africa_SAAR-1776_2001     GACATCCCTTACACCGGGAAGCGGGAAGACATATGGTGTGGAAGCCTGATAGGCACGCGA
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Spain_MB119/06_2006,            ACACGAGCAACGTGGGCTGAAAACATCTACGCGGCCATAAACCAGGTGAGGGCCATTATT
Dakar_ArD192495,                ACACGGGCAACGTGGGCTGAAAACATCTACGCGGCCATAAACCAGGTGAGGGCCATTATT
Senegal_ArD101291_1993          ACACGGGCAACGTGGGCTGAAAACATCTACGCGGCCATAAACCAGGTGAGGGCCATTATT
Germania_V45_2011               ACACGGGCAACGTGGGCTGAAAACATCTACGCAGCCATTAACCAGGTGAGGGCCATTATT
Germany_V382_2013               ACACGGGCAACGTGGGCTGAAAACATCTACGCAGCCATTAACCAGGTGAGGGCCATTATT
Vienna_2001                     ACACGGGCAACGTGGGCTGAAAACATCTACGCAGCCATTAACCAGGTGAGAGCCATTATT
Bologna_2009                    ACACGGGCAACGTGGGCTGAAAACATCTACGCAGCCATTAACCAGGTGAGGGCCATTATT
Italia_2009                     ACACGGGCAACGTGGGCTGAAAACATCTACGCAGCCATTAACCAGGTGAGGGCCATTATT
Dakar_ArD19848_1974             ACACGGGCAACGTGGGCTGAAAACATCTACGCGGCCATAAACCAGGTGAGGGCCATTATT
South_Africa_SAAR-1776_2001     ACACGGGCAACGTGGGCTGAAAACATCTACGCGGCCATAAACCAGGTGAGGGCAATTATT
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Spain_MB119/06_2006,            GGCCAGGAAAAGTATAGGGACTACATGCTCTCGCTTAGAAGATATGAAGAAGTTAGTGTC
Dakar_ArD192495,                GGCCAGGAAAAGTACAGGGATTACATGCTTTCACTTAGGAGATATGAAGAAGTTAGTGTC
Senegal_ArD101291_1993          GGCCAGGAAAAGTATAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTAATGTC
Germania_V45_2011               GGCCAGGAAAAATACAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTAATGTC
Germany_V382_2013               GGCCAGGAAAAATACAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTAATGTC
Vienna_2001                     GGCCAGGAAAAATACAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTAATGTC
Bologna_2009                    GGCCAGGAAAAATACAGGGATTACATGCTTTCACTTAGAAGATATGAAGATGTTAATGTC
Italia_2009                     GGCCAGGAAAAATACAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTAATGTC
Dakar_ArD19848_1974             GGCCAGGAAAAGTACAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTAGTGTC
South_Africa_SAAR-1776_2001     GGCCAGGAAAAGTATAGGGATTACATGCTTTCACTTAGAAGATATGAAGAAGTTGATGTC
                                *********** ** ***** ******** ** ***** *********** ***  ****

Spain_MB119/06_2006,            CAAGAGGACAGGGTTTTGTAAACAAGTGTTTAGGGTTTTACAACTTAATCAAATATGTAA
Dakar_ArD192495,                CAGGAGGACAGGGTTTTGTAAATAAGTGTTTAGGGTTTTGTAATTTAATCAAATATGAAA
Senegal_ArD101291_1993          CAGGAGGACAGGGTTCTGTAAATAAGTGTTTAGGGTTTTGTAATTTAATTAAATATGCAA
Germania_V45_2011               CAGGAGGACAGGGTTTTGTAAATAAGTGTTTAGGGTTTTGCAATTTAATTAAATATGCAA
Germany_V382_2013               CAGGAGGACAGGGTTTTGTAAATAAGTGTTTAGGGTTTTGCAATTTAATTAAATATGCAA
Vienna_2001                     CAGGAGGACAGGGTTTTGTAAATAAGTGTTTAGGGTTTTGCAATTTAATTAAATATGCAA
Bologna_2009                    CAGGAGGACAGGGTTCTGTAAATAAGTGTTTAGGGTTTTGTAATTTAATTAAATATGCAA
Italia_2009                     CAGGAGGACAGGGTTTTGTAAATAAGTGTTTAGGGTTTTGTAATTTAATTAAATATGCAA
Dakar_ArD19848_1974             CAGGAGGACAGGGTTTTGTAAATAAGTGCTTAGGGTTTTGTAATTTAACCAAATGTGTAA
South_Africa_SAAR-1776_2001     CAAGAGGACAGGGTTTTGTAAATAAGTGTTTAGGGTTTTGTAATTTATTCAAATATGTAA
                                ** ************ ****** ***** **********  ** ***   **** ** **
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Spain_MB119/06_2006,            TGTAATTTAGTTGTAAGTATTTGATTGTGTAGCTTTACTTAGCATCATTTTAGGATAATA
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Senegal_ArD101291_1993          TGTAATTTAGTTGTAAATATTTGATTGCGTAGCTCTATTTAGTGTTGTTTTAGGATAGTA
Germania_V45_2011               TGTAATTTAGTTGTAAATATTTGATTGTGTAGCTTTATTTAGCATTGTTTTAGGATAGTA
Germany_V382_2013               TGTAATTTAGTTGTAAATATTTGATTGTGTAGCCTTATTTAGCATTGTTTTAGGATAGTA
Vienna_2001                     TGTAATTTAGTTGTAAATATTTGATTGTGTAGCTTTATTTAGCATTGTTTTAGGATAGTA
Bologna_2009                    TGTAATTTAGTTGTAAATATTTGATTGTGTAGCTTTATTTAGCATTGTTTTAGGATAGTA
Italia_2009                     TGTAATTTAGTTGTAAATATTTGATTGTGTAGCTTTATTTAGCATTGTTTTAGGATAGTA
Dakar_ArD19848_1974             TGTAATTTAGTTGTGAATATTTGATTGTGTAGCTTTATTTAGTATCATTTTAGGATAGTA
South_Africa_SAAR-1776_2001     TGTAATTTAGTTGTAAGTATTTGATTGTGTAGCTTTATTTAGTATCATTTTAGGATAATA
                                ************** * ********** *****  **  ***  *  ********** **

Spain_MB119/06_2006,            GAAGTTAAGTTTGTATTTAGTTATTTTATTTAATTGGATTTGATAGTCAGGCCAGGGCAA
Dakar_ArD192495,                GAAGTTAAGGTTTTGTTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Senegal_ArD101291_1993          GAAGTTAAGGTTTTATTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Germania_V45_2011               GAAGTTAAGGTTTTGTTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Germany_V382_2013               GAAGTTAAGGTTTTATTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Vienna_2001                     GAAGTTAAGGTTTTATTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Bologna_2009                    GAAGTTAAGGTTTTGTTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Italia_2009                     GAAGTTAAGGTTTTATTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
Dakar_ArD19848_1974             GAAGTTAAGGTTTTATTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGCAA
South_Africa_SAAR-1776_2001     GAAGTTGAGTTTGTATTTAGTTATTTTATTTAATTGAATTTGATAGTCAGGCCAGGGTAA
                                ****** ** ** * ********************** ******************** **

Spain_MB119/06_2006,            CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Dakar_ArD192495,                CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Senegal_ArD101291_1993          CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Germania_V45_2011               CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Germany_V382_2013               CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Vienna_2001                     CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Bologna_2009                    CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Italia_2009                     CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
Dakar_ArD19848_1974             CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
South_Africa_SAAR-1776_2001     CCTGCCACCGGAAGTTGAGTAGACGGTGCTGCCTGCGACTCAACCCCAGGCGGACTGGGT
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Spain_MB119/06_2006,            TAACAAAGCTGGCCGCTGATGATAGGAAAGCCCCTCAGAACCGTCTCGGAGAGGGACCCT
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Senegal_ArD101291_1993          TAACAAAGCTGACCGCTGATGATAGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
Germania_V45_2011               TAGCAAAGCTGACCGCTGATGATGGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
Germany_V382_2013               TAGCAAAGCTGACCGCTGATGATGGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
Vienna_2001                     TAACAAAGCTGACCGCTGATGATGGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
Bologna_2009                    TAACAAAGCTGACCGCTGATGATGGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
Italia_2009                     TAACAAAGCTGACCGCTGATGATGGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
Dakar_ArD19848_1974             TATCAAAGCTGGCCGCTGATGATAGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
South_Africa_SAAR-1776_2001     TAACAAAGCTGGCCGCTGATGATAGGAAAGCCCCTCAGAACCGTTTCGGAGAGGGACCCT
                                ** ******** *********** ************** ***** ***************

Spain_MB119/06_2006,            GCCTATTGGAAGCGTTCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Dakar_ArD192495,                GCTTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Senegal_ArD101291_1993          GCCTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Germania_V45_2011               GCCTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Germany_V382_2013               GCCTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Vienna_2001                     GCCTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Bologna_2009                    GCCTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Italia_2009                     GCCTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
Dakar_ArD19848_1974             GCTTATTGGAAGCGTCCAGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
South_Africa_SAAR-1776_2001     GCTTATTGGAAGCGTCCGGCCCGTGTCAGGCCGCAAAGCGCCACTTCGCCAAGGAGTGCA
                                ** ************ * ****************************************

Spain_MB119/06_2006,            GCCTGTATGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Dakar_ArD192495,                GCCTGTATGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Senegal_ArD101291_1993          GCCTGTATGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Germania_V45_2011               GCCTGTACGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Germany_V382_2013               GCCTGTACGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Vienna_2001                     GCCTGTACGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Bologna_2009                    GCCTGTACGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Italia_2009                     GCCTGTACGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
Dakar_ArD19848_1974             GCCTGTATGGCCCCAGGAGGACTGGGTTATCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
South_Africa_SAAR-1776_2001     GCCTGTATGGCCCCAGGAGGACTGGGTTACCAAAGCCGAAAGGCCCCCACGGCCCAAGCG
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Spain_MB119/06_2006,            AACAGACGGTGATGCGAACTGTTTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
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Senegal_ArD101291_1993          AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAG----------------------
Germania_V45_2011               AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
Germany_V382_2013               AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
Vienna_2001                     AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
Bologna_2009                    AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
Italia_2009                     AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
Dakar_ArD19848_1974             AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAG----------------------
South_Africa_SAAR-1776_2001     AACAGACGGTGATGCGAACTG-TTCGTGGAAGGACTAGAGGTTAGAGGAGACCCCGTGGA
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Spain_MB119/06_2006,            ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAACGGTGGAAGGACTAGAGGTTA
Dakar_ArD192495,                ------------------------------------------------------------
Senegal_ArD101291_1993          ------------------------------------------------------------
Germania_V45_2011               ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAACGGTGGAAGGACTAGAGGTTA
Germany_V382_2013               ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAACGGTGGAAGGACTAGAGGTTA
Vienna_2001                     ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAACGGTGGAAGGACTAGAGGTTA
Bologna_2009                    ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAACGGTGGAAGGACTAGAGGTTA
Italia_2009                     ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAACGGTGGAAGGACTAGAGGTTA
Dakar_ArD19848_1974             ------------------------------------------------------------
South_Africa_SAAR-1776_2001     ACTTAGGTGCGGCCCAAGCCGTTTCCGAAGCTGTAGGAGCGGTGGAAGGACTAGAGGTTA


Spain_MB119/06_2006,            GAGGAGACCCCGCATCATAAGCATC---AAAACAGCATATTGACACCTGGGAATTAGACT
Dakar_ArD192495,                ------------------------------------------------------------
Senegal_ArD101291_1993          ------------------------------------------------------------
Germania_V45_2011               GAGGAGACCCCGCATCATGAGCATC-AAAAAACAGCATATTGACACCTGGGAATTAGACT
Germany_V382_2013               GAGGAGACCCCGCATCATGAGCATC-AAAAAACAGCATATTGACACCTGGGAATTAGACT
Vienna_2001                     GAGGAGACCCCGCATCATAAGCATCAAAAAAACAGCATATTGACACCTGGGAATTAGACT
Bologna_2009                    GAGGAGACCCCGCATCATAAGCATC-AAAAAACAGCATATTGACACCTGGGAATTAGACT
Italia_2009                     GAGGAGACCCCGCATCATAAGCATC-AAAAAACAGCATATTGACACCTGGGAATTAGACT
Dakar_ArD19848_1974             ------------------------------------------------------------
South_Africa_SAAR-1776_2001     GAGGAGACCCCGCATCATAAGCATC--AAAAACAGCATATTGACACCTGGGAATTAGACT
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Spain_MB119/06_2006,            AGGAGATCTTCTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG
Dakar_ArD192495,                ------------------------------------------------------------
Senegal_ArD101291_1993          ------------------------------------------------------------
Germania_V45_2011               AGGAGATCTTCTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG
Germany_V382_2013               AGGAGATCTTTTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG
Vienna_2001                     AGGAGATCTTCTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG
Bologna_2009                    AGGAGATCTTCTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG
Italia_2009                     AGGAGATCTTCTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG
Dakar_ArD19848_1974             ------------------------------------------------------------
South_Africa_SAAR-1776_2001     AGGAGATCTTCTGCTCTATTCCAACATCAACCACAAGGCACAGAGCGCCGAAAATTGTGG


Spain_MB119/06_2006,            CTGGTGGGGAACTAGACCACAGGATCT
Dakar_ArD192495,                ---------------------------
Senegal_ArD101291_1993          ---------------------------
Germania_V45_2011               CTGATGGGGGGCTAGACCACAGGATCT
Germany_V382_2013               CTGATGGGGAACAAGACAACAGGATCT
Vienna_2001                     CTGGTGGGGAACTAGACCACAGGATCT
Bologna_2009                    CTGATGGGGAACAAGACCACAGGATCT
Italia_2009                     TTGGTGGGGAACTAGACCACAGGATCT
Dakar_ArD19848_1974             ---------------------------
South_Africa_SAAR-1776_2001     CTGGTGGGGAACTAGACCACAGGATCT
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PhD Thesis in Life Sciences and Biotechnologies Curriculum Microbiology and Immunology
University of Sassari
"Characterization and phylogenetic analysis of *Usutu* virus isolates in Sardinia"
PhD student Roberto Bechere

Technical Appendix (**Table S2**)

Usutu virus, reference strain "Vienna2001" complete genome sequence (AY453411)

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   1 agtcgttcgt ctgcgtgagc tctactactt agtattgttt ttggaggatc gtgagattaa
  61 cacagtgccg gcagtttctt tgagcgttga ttttcaatgt ctaagaaacc aggagggccc
 121 ggaagaaacc gggccatcaa tatgctgaaa cgcggcatac cccgcgtatt cccactagtg
 181 ggagtgaaga gggtagtcat gggcttgttg gatggaagag gaccagtgcg attcgtgctg
 241 gccttgatga cattcttcaa gttcaccgcg cttgccccga cgaaggcctt gctaggccgt
 301 tggaagcgca tcaacaagac cacggcaatg aaacacctga ctagcttcaa aaaggaatta
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 421 ccaggactag tgatgatcat aacactcatg acggttgttt caatggtttc ctctttaaag
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 661 gaagacattg actgttggtg tgacaaacaa cccatgtatg ttcactatgg aaggtgcaca
 721 agaaccagac actcgaagcg gagtcggcgg tcgatcgcag tgcagacgca cggggagagt
 781 atgctggcta acaagaagga tgcttggcta gactcaacca aggcttcgag atacctgatg
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1621 gaatggttta atgacttggc cctcccatgg acttcaccag ctagctcaaa ttggagaaat
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6001 cctagtcaga taggtgatga gtaccactat ggaggaggca caagcgaaga tgacacgatc
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6421 cagtcgctca agtggttcaa ggactttgcg gctggtaagc gatcagcagt gggattcctt
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6841 tcccagacgg acaaccagct agctgtgttt ctgatctgtg tcttgctggt ggtgggagtg
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6961 tccagcacac gtcaaccaca aagtgctctg ccgctaccct ccatgaacgc tttggcattg
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 9541 gtccagctta ttagactgat ggaagctgaa ggagtgattg ggcaggaaca tctggaaagt
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10981 ggagatcttc tgctctattc caacatcaac cacaaggcac agagcgccga aaattgtggc
11041 tggtggggaa ctagaccaca ggatct
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Primers used for the full-length amplification of *Usutu* virus

1) Usuv F1deg / Usuv327R

2) Usuv232F / Usuv1246R

3) Usuv1124F / Usuv2353R

4) Usuv2295F / Usuv4693R

5) Usuv4578F / Usuv5509R

6) Usuv5443F / Usuv6935R

7) Usuv6861F / Usuv8956R

8) Usuv8885F / Usuv9994R

9) Usuv9643F* / Usuv10823R*

10) UsuvADF (10646) F* / Usuv11066Rdeg or UsuvADF (10646) F* / Usuv11014R*

11) Usuv10794F** / Usuv11027R*

12) Usuv6901F / Usuv7845R

13) Usuv7769F / Usuv8908R

14) Usuv3167F / Usuv4600R

(*) from Cadar *et al* 2014

(**) from Bakonyi *et al* 2004