

On July 25, 2012, SBV infection was identified in a cow in Jura Canton in the northwestern, French-speaking region of Switzerland (Romandie) (7). A serologic study conducted in the United Kingdom showed that several cattle and sheep seroconverted for SBV in 2012 (8). However, our data show that SBV survived the winter, when midge numbers decreased. The precise mechanisms of SBV overwintering are not known and need to be explored.

The consequences of SBV recirculation should be investigated, particularly in pregnant cows, ewes, and goats. The 2 SBV-positive farms described in this report are located in a previously SBV-free area (Finistère-Brittany) or an area in which the infection rate was low (Pyrénées-Atlantiques) in the winter of 2011–2012, during which seroprevalence for most herds was probably weak (C. Sailleau et al., unpub. data). Therefore, reemergence of cases of congenital forms of SBV infection in France and others areas of Europe can be expected.

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## Toscana Virus Isolated from Sandflies, Tunisia

**To the Editor:** Toscana virus (TOSV; genus *Phlebovirus*, family *Bunyaviridae*) is transmitted by sandflies, mostly the species *Phlebotomus perniciosus* and *P. perfiliewi* (1). Initially discovered in central Italy, TOSV was recently identified in other European countries (i.e., Portugal, Spain, France, Croatia, and Turkey) (2). TOSV is a primary cause of aseptic meningitis during warm months (2). A seroprevalence study suggested that TOSV is present in Tunisia and may cause neuroinvasive infections, but definitive evidence of TOSV circulation has not been possible because it is difficult to distinguish from the antigenically related phlebovirus Punique virus (3,4); both viruses are members of the species *Sandfly fever Naples virus*. We investigated the prevalence of TOSV among sandflies in northern Tunisia.

A total of 5,288 sandflies (3,547 females, 1,740 males) were collected during June–October 2010 by using CDC light traps (John W. Hock Company, Gainesville, FL, USA) at Utique (37°08'N, 7°74'E), a focus for visceral leishmaniasis in northern Tunisia. Sandflies were separated by sex and trapping nights and pooled with  $\geq 30$  specimens by pool. Pools were processed as described (4) and subjected to PCR detection of phlebovirus RNA targeting 2 genes independently (4–6) and virus isolation onto Vero cells. Of 249 pools processed, 8 strains of phleboviruses were isolated: 2 TOSV, 3 Punique virus, and 3 other phleboviruses currently being characterized.

TOSV strains were obtained from 2 pools of sandflies trapped in September 2010, T152 and T166, consisting of 30 males and 30 females, respectively. These pools were positive for TOSV RNA by sequencing of

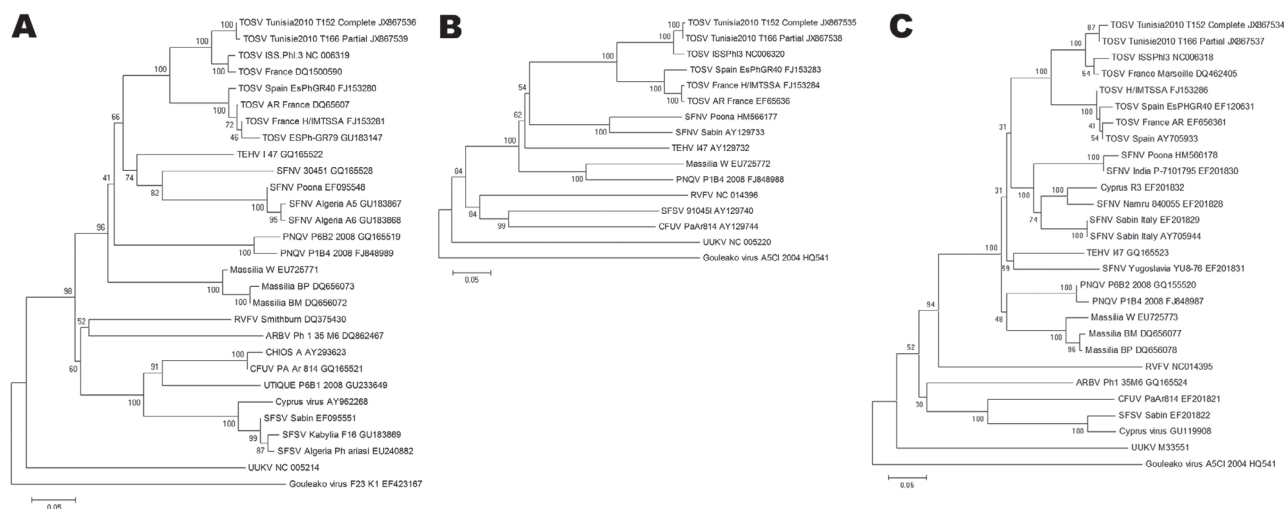
2 PCR products (201-nt and 280-nt sections in the large [L] and small [S] gene segments, respectively). Supernatant of the third passage was prepared for electron microscopy, which showed spherical and pleomorphic structures, 80–120 nm in diameter, compatible with viruses of the family *Bunyaviridae*. Complete genome sequencing was then done by using the Ion PGM Sequencer (Life Technologies SAS, Saint Aubin, France) (7); a total of 165,307 reads were obtained, of which 135,700 matched with the sequence of TOSV Iss.PhL3 used as reference. The viral genome of TOSV Tunisia-2010-T152 (GenBank accession nos. JX867534–JX867536) was composed of 12,488 nt; the complete sequence consisted of 1,869 nt, 4,215 nt, and 6,404 nt for the S, medium [M], and L RNA segments, respectively. The partial S sequence of the TOSV Tunisia-2010-T166 strain (GenBank accession nos. JX867537–JX867539) was identical to that of T152, but 1 synonymous mutation was observed in the partial L sequence and 1 nonsynonymous mutation in the partial M sequence (I906V).

The TOSV Tunisia-2010-T152 strain was aligned with homologous sequences retrieved from the GenBank database. Genetic distances were calculated at the amino acid and nucleotide levels by using the p-distance algorithm (online Technical Appendix Tables 1–3, [wwwnc.cdc.gov/EID/article/12-1463-Techapp1/.pdf](http://wwwnc.cdc.gov/EID/article/12-1463-Techapp1/.pdf)). Phylogenetic studies were performed by using the neighbor-joining method in MEGA5 (8) (Figure). The robustness of the nodes was tested by 1,000 bootstrap replications. We found that TOSV Tunisia-2010-T152 was most closely related to the prototype strain from Italy, Iss.PhL3, with nucleotide/amino acid distances of 0.031/0.052, 0.032/0.073, and 0.039/0.012 for the S, M, and L RNA sequences, respectively. Together, these genetic distances and phylogram topologies indicate that TOSV Tunisia-2010-T152 is most closely related to strains within the Italian lineage, although it may represent a distinct sublineage, more distantly related to strains belonging to the Spanish lineage (9).

Concomitantly with virus isolation, the phenology of sandfly species

was studied during May–November 2010. Sandflies were identified, and the density was calculated as described (10). Most of the sandflies belonged to the subgenus *Larrousius* (98.3%). *P. perniciosus* sandflies were the most abundant species (71.74%), followed by *P. longicuspis* (17.47%) and *P. perfileiwi* (8.82%). Other sandfly species, such as *Phlebotomus (Phlebotomus) papatasi*, *Phlebotomus (Paraphlebotomus) sergenti*, *Sergentomyia minuta parotti*, *S. christophersi*, and *S. antennata* were found, but these were much less abundant. The phenology of 3 main sandfly species showed 2 main peaks: 1 small peak in June and a second, larger peak during September–October (online Technical Appendix Figure).

In summary, of a total of 5,288 sandflies collected, 2 pools were positive for TOSV, yielding an infection rate of 0.03%. A similar infection rate was observed in Spain (0.05%) (9); however, the infection rates in Italy (0.22%) and in France (0.29%) are substantially higher (1,6). The isolation of TOSV from male and female sandflies suggests transovarial transmission in nature, as reported



in Italy and Spain (1,9). In southern European countries, TOSV is mostly transmitted by *P. perniciosus* and *P. perfiliewi* sandflies (1,6,9), whereas *P. perniciosus*, *P. longicuspis*, and *P. perfiliewi* are the most abundant sandfly species in northern Tunisia. It is therefore probable that TOSV is transmitted by sandfly species of the subgenus *Larrousius*.

We found that 2 phleboviruses belonging to the *Sandfly fever Naples virus* species, TOSV and Punique virus, are cocirculating in northern Tunisia. This finding calls for further investigation of these viruses' potential effect on human health in this area.

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## Seroprevalence of Dengue in American Samoa, 2010

**To the Editor:** Since the 1970s, regular dengue epidemics have caused considerable illness in the Pacific region (1). In 2009, an epidemic year, the incidence of reported clinical dengue cases in American Samoa reached 644 cases/100,000 population; in 2010, incidence decreased to 77 cases/100,000 population (2). Dengue surveillance in American Samoa is being developed, but the effects of this disease are unknown.

In 2010, blood samples were collected in American Samoa primarily for a leptospirosis seroprevalence study. Samples were also tested for IgG antibodies against dengue virus, and a seroprevalence of 95.6% was observed. We report this finding and advocate improved surveillance and integrated control programs to limit dengue transmission in American Samoa.

A cross-sectional seroprevalence study was conducted during May–July 2010 with the primary aims of identifying risk factors for human leptospirosis and providing an evidence base to direct public health interventions in American Samoa (3,4). During the study, investigators encountered community concern about dengue and were asked by health authorities to use the remaining collected serum for a dengue seroprevalence study. Amendments to the original human research ethics applications submitted to the American Samoa Institutional Review Board and the University of Queensland

# Toscana Virus Isolated from Sandflies, Tunisia

## Technical Appendix

Technical Appendix Table 1. Genetic pairwise distances between Tunisian Toscana virus (TOSV) strains and selected phleboviruses in large RNA segment.

N	Virus	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
		<i>Nucleotide sequences</i>																													
1	TOSV_Tunisia2010_T152_Complete		0.002	0.039	0.067	0.146	0.146	0.179	0.147	0.269	0.328	0.299	0.333	0.338	0.266	0.289	0.271	0.284	0.284	0.423	0.413	0.369	0.418	0.383	0.399	0.356	0.383	0.380	0.482	0.575	
2	TOSV_Tunisie2010_T166_Partial	0.000		0.059	0.059	0.166	0.168	0.179	0.156	0.301	0.328	0.301	0.333	0.338	0.275	0.289	0.271	0.284	0.284	0.423	0.413	0.390	0.418	0.390	0.399	0.358	0.384	0.368	0.501	0.588	
3	TOSV_ISS.PhI.3_NC_006319	0.012	0.006		0.017	0.149	0.149	0.174	0.150	0.272	0.333	0.293	0.338	0.333	0.273	0.308	0.259	0.308	0.308	0.413	0.403	0.373	0.413	0.379	0.394	0.356	0.385	0.382	0.461	0.573	
4	TOSV_France_DQ1500590	0.011	0.006	0.006		0.153	0.155	0.174	0.150	0.290	0.333	0.293	0.338	0.333	0.265	0.308	0.259	0.308	0.308	0.413	0.403	0.366	0.413	0.385	0.394	0.356	0.385	0.348	0.473	0.583	
5	TOSV_AR_France_DQ65607	0.032	0.036	0.035	0.034		0.008	0.020	0.027	0.265	0.353	0.329	0.318	0.338	0.284	0.313	0.246	0.348	0.348	0.433	0.423	0.389	0.393	0.373	0.399	0.384	0.401	0.365	0.464	0.579	
6	TOSV_France_H/IMTSSA_FJ153281	0.031	0.036	0.034	0.034	0.002		0.015	0.025	0.266	0.348	0.327	0.318	0.338	0.280	0.308	0.251	0.338	0.338	0.433	0.423	0.389	0.393	0.374	0.394	0.382	0.401	0.361	0.466	0.580	
7	TOSV_ESPh-GR79_GU183147	0.030	0.030	0.015	0.015	0.000	0.000		0.020	0.353	0.353	0.353	0.318	0.328	0.333	0.303	0.259	0.338	0.333	0.438	0.428	0.428	0.398	0.433	0.408	0.408	0.478	0.438	0.542	0.577	
8	TOSV_Spain_EsPhGR40_FJ153280	0.031	0.036	0.034	0.034	0.003	0.003	0.000		0.268	0.343	0.337	0.318	0.338	0.286	0.294	0.244	0.333	0.333	0.443	0.433	0.393	0.403	0.378	0.390	0.378	0.399	0.368	0.471	0.573	
9	Massilia_W_EU725771	0.178	0.196	0.181	0.198	0.176	0.176	0.269	0.175		0.030	0.042	0.358	0.333	0.293	0.368	0.279	0.343	0.348	0.413	0.403	0.360	0.398	0.332	0.394	0.349	0.375	0.417	0.487	0.580	
10	Massilia_BP_DQ656073	0.254	0.254	0.269	0.269	0.284	0.284	0.284	0.284	0.015		0.000	0.338	0.318	0.343	0.368	0.313	0.338	0.343	0.403	0.393	0.393	0.398	0.328	0.413	0.413	0.443	0.468	0.552	0.577	
11	Massilia_BM_DQ656072	0.202	0.202	0.208	0.208	0.220	0.220	0.284	0.220	0.006	0.000		0.338	0.318	0.293	0.368	0.277	0.338	0.343	0.403	0.393	0.366	0.398	0.347	0.408	0.362	0.380	0.398	0.515	0.594	
12	PNQV_P6B2_2008_GQ165519	0.269	0.269	0.254	0.254	0.254	0.254	0.254	0.254	0.239	0.239		0.055	0.398	0.323	0.333	0.398	0.398	0.398	0.468	0.458	0.458	0.468	0.428	0.453	0.453	0.458	0.458	0.542	0.562	
13	PNQV_P1B4_2008_FJ848989	0.239	0.239	0.224	0.224	0.224	0.224	0.224	0.224	0.239	0.239	0.045		0.388	0.318	0.318	0.388	0.388	0.388	0.473	0.463	0.463	0.473	0.408	0.443	0.443	0.453	0.458	0.552	0.547	
14	SFNV_Poona_EF095548	0.180	0.185	0.186	0.181	0.186	0.186	0.254	0.186	0.230	0.358	0.232	0.328	0.328		0.249	0.267	0.010	0.000	0.428	0.418	0.349	0.433	0.360	0.418	0.362	0.409	0.354	0.501	0.586	
15	SFNV_30451_GQ165528	0.224	0.224	0.209	0.209	0.194	0.194	0.194	0.194	0.358	0.343	0.343	0.284	0.284	0.090		0.249	0.249	0.249	0.249	0.493	0.483	0.483	0.463	0.433	0.428	0.428	0.433	0.473	0.527	0.552
16	TEHV_I_47_GQ165522	0.143	0.143	0.143	0.143	0.149	0.149	0.119	0.149	0.190	0.299	0.196	0.299	0.269	0.155	0.164		0.294	0.294	0.458	0.458	0.414	0.443	0.352	0.455	0.368	0.392	0.370	0.497	0.572	
17	SFNV_Algeria_A5_GU183867	0.254	0.254	0.269	0.269	0.269	0.269	0.269	0.269	0.373	0.358	0.358	0.328	0.328	0.015	0.104	0.224		0.010	0.438	0.428	0.428	0.443	0.428	0.433	0.433	0.468	0.478	0.557	0.602	
18	SFNV_Algeria_A6_GU183868	0.239	0.239	0.254	0.254	0.254	0.254	0.254	0.254	0.373	0.358	0.358	0.328	0.328	0.000	0.090	0.209	0.015		0.428	0.418	0.418	0.433	0.428	0.428	0.428	0.468	0.483	0.562	0.597	
19	SFSV_Kabyliya_F16_GU183869	0.507	0.507	0.507	0.507	0.507	0.507	0.507	0.507	0.433	0.433	0.433	0.537	0.522	0.522	0.537	0.493	0.522	0.522		0.020	0.010	0.075	0.388	0.274	0.274	0.279	0.438	0.507	0.612	
20	SFSV_Algeria_Ph_ariasi_EU240882	0.478	0.478	0.463	0.463	0.463	0.463	0.463	0.463	0.418	0.418	0.418	0.507	0.493	0.507	0.493	0.463	0.507	0.507	0.060		0.010	0.075	0.388	0.274	0.274	0.279	0.438	0.527	0.617	
21	SFSV_Sabin_EF095551	0.389	0.411	0.389	0.390	0.384	0.384	0.478	0.384	0.346	0.403	0.363	0.507	0.493	0.377	0.507	0.387	0.507	0.507	0.030	0.030		0.065	0.357	0.263	0.261	0.285	0.357	0.477	0.614	
22	Cyprus_virus_AY962268	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.403	0.403	0.403	0.507	0.493	0.507	0.507	0.463	0.507	0.507	0.045	0.045	0.015		0.398	0.264	0.264	0.274	0.438	0.542	0.612	
23	RVFV_Smithburn_DQ375430	0.323	0.333	0.318	0.322	0.328	0.328	0.403	0.328	0.292	0.358	0.315	0.418	0.418	0.344	0.463	0.327	0.478	0.478	0.388	0.373	0.319	0.358		0.380	0.354	0.383	0.361	0.487	0.577	
24	CHIOS_A_AY293623	0.479	0.479	0.479	0.479	0.479	0.479	0.493	0.479	0.465	0.478	0.465	0.507	0.493	0.493	0.507	0.479	0.507	0.507	0.239	0.239	0.211	0.209	0.408		0.014	0.202	0.465	0.512	0.606	
25	CFUV_PA_Ar_814_GQ165521	0.381	0.381	0.381	0.381	0.375	0.375	0.493	0.375	0.375	0.478	0.375	0.507	0.493	0.381	0.507	0.363	0.507	0.507	0.239	0.239	0.149	0.209	0.351	0.014		0.230	0.384	0.503	0.612	
26	Utique_P6B1_2008_GU233649	0.399	0.399	0.399	0.399	0.399	0.399	0.507	0.399	0.381	0.478	0.381	0.522	0.507	0.399	0.522	0.393	0.522	0.522	0.239	0.239	0.185	0.194	0.333	0.056	0.089		0.397	0.496	0.598	
27	ARBV_Ph_1_35_M6_DQ862467	0.364	0.327	0.364	0.316	0.364	0.364	0.448	0.364	0.379	0.507	0.351	0.522	0.507	0.328	0.493	0.315	0.522	0.522	0.552	0.522	0.384	0.522	0.355	0.563	0.423	0.440		0.499	0.602	
28	UUKV_NC_005214	0.524	0.560	0.524	0.542	0.529	0.529	0.657	0.529	0.524	0.657	0.571	0.672	0.657	0.563	0.687	0.577	0.672	0.672	0.672	0.701	0.557	0.672	0.518	0.662	0.595	0.583	0.570		0.580	
29	Gouleako_virus_F23_K1_EF423167	0.696	0.719	0.701	0.710	0.701	0.701	0.701	0.701	0.723	0.746	0.743	0.731	0.716	0.703	0.731	0.725	0.716	0.716	0.791	0.791	0.770	0.791	0.723	0.746	0.749	0.754	0.755	0.720		
		<i>Amino acid sequences</i>																													

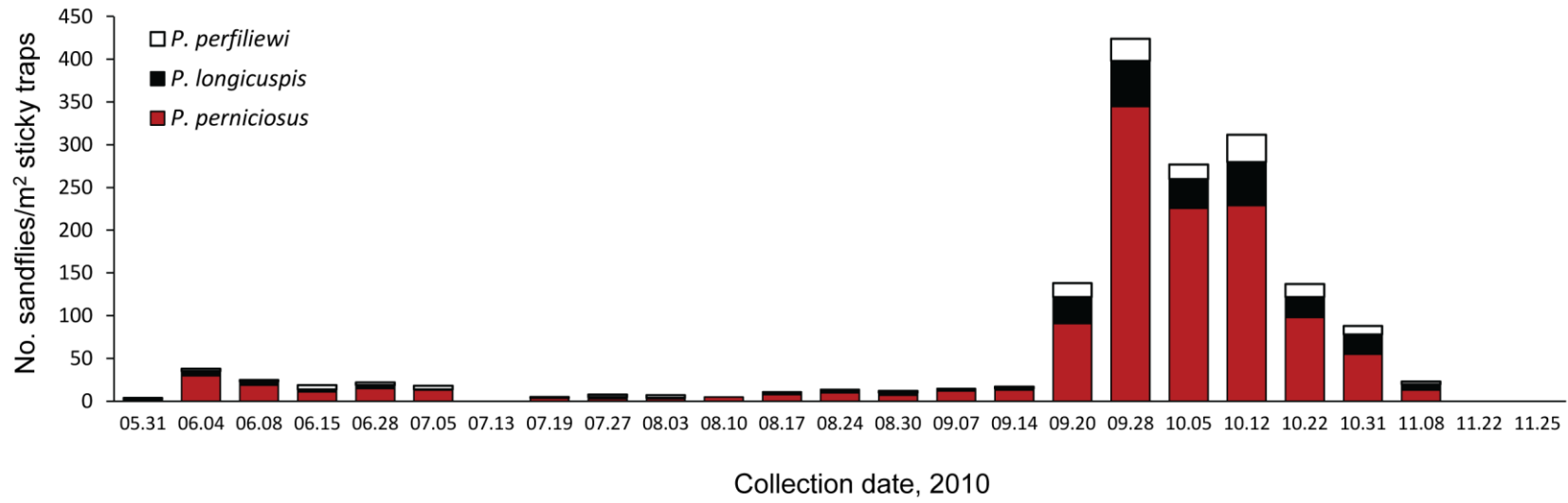


Technical Appendix Table 2. Genetic pairwise distances between Tunisian Toscana virus (TOSV) strains and selected phleboviruses in medium RNA segment.

N°	Virus	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Nucleotide sequences</i>																	
1	TOSV_Tunisia2010_T152_Complete		0.002	0.032	0.176	0.173	0.178	0.437	0.449	0.397	0.397	0.401	0.527	0.587	0.526	0.632	0.680
2	TOSV_Tunisie2010_T166_partial	0.010		0.022	0.175	0.177	0.177	0.434	0.449	0.415	0.402	0.419	0.530	0.550	0.526	0.614	0.655
3	TOSV_ISSPhI3_NC006320	0.073	0.040		0.182	0.179	0.183	0.437	0.437	0.399	0.395	0.392	0.523	0.590	0.527	0.631	0.678
4	TOSV_France_H/IMTSSA_FJ153284	0.423	0.374	0.427		0.007	0.055	0.434	0.416	0.394	0.405	0.404	0.527	0.580	0.543	0.629	0.681
5	TOSV_AR_France_EF65636	0.415	0.384	0.419	0.020		0.057	0.436	0.418	0.393	0.410	0.404	0.528	0.582	0.543	0.629	0.680
6	TOSV_Spain_EsPhGR40_FJ153283	0.432	0.404	0.428	0.150	0.154		0.443	0.416	0.396	0.414	0.416	0.530	0.585	0.552	0.627	0.678
7	Massilia_W_EU725772	0.728	0.722	0.732	0.732	0.733	0.743		0.243	0.431	0.397	0.413	0.559	0.583	0.566	0.625	0.677
8	PNQV_P1B4_2008_FJ848988	0.725	0.711	0.716	0.716	0.716	0.716	0.520		0.421	0.413	0.429	0.529	0.578	0.531	0.601	0.652
9	SFNV_Poona_HM566177	0.700	0.705	0.707	0.690	0.680	0.682	0.726	0.700		0.403	0.178	0.546	0.573	0.547	0.635	0.682
10	TEHV_I47_AY129732	0.619	0.646	0.619	0.657	0.667	0.657	0.670	0.696	0.713		0.378	0.525	0.563	0.558	0.623	0.650
11	SFNV_Sabin_AY129733	0.679	0.674	0.679	0.687	0.672	0.702	0.695	0.720	0.359	0.634		0.550	0.537	0.526	0.653	0.636
12	SFSV_91045I_AY129740	0.776	0.785	0.765	0.745	0.755	0.765	0.806	0.816	0.760	0.755	0.750		0.524	0.394	0.592	0.639
13	RVFV_NC_014396	0.846	0.766	0.846	0.843	0.845	0.846	0.851	0.869	0.828	0.820	0.797	0.755		0.497	0.658	0.681
14	CFUV_PaAr814_AY129744	0.800	0.800	0.790	0.820	0.820	0.810	0.820	0.780	0.776	0.830	0.765	0.653	0.768		0.577	0.617
15	UUKV_NC_005220	0.887	0.823	0.882	0.883	0.880	0.875	0.876	0.900	0.886	0.873	0.875	0.845	0.883	0.796		0.692
16	Gouleako_virus_A5CI_2004_HQ541	0.905	0.883	0.906	0.907	0.908	0.907	0.915	0.928	0.909	0.890	0.857	0.906	0.904	0.866	0.917	
<i>Amino acid sequences</i>																	

Technical Appendix Table 3. Genetic pairwise distances between Tunisian Toscana virus (TOSV) strains and selected phleboviruses in small RNA segment.

N°	Virus	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
																														<i>Nucleotide sequences</i>
1	TOSV_Tunisia2010_T152_Complete		0.000	0.031	0.051	0.136	0.134	0.142	0.134	0.236	0.236	0.228	0.215	0.238	0.377	0.212	0.200	0.216	0.219	0.225	0.236	0.223	0.521	0.518	0.563	0.511	0.429	0.610	0.638	
2	TOSV_Tunisie2010_T166-Partial	0.000		0.028	0.051	0.134	0.119	0.119	0.124	0.217	0.236	0.229	0.221	0.217	0.195	0.206	0.193	0.198	0.197	0.226	0.200	0.202	0.462	0.462	0.433	0.454	0.431	0.545	0.641	
3	TOSV_ISSPhI3_NC006318	0.052	0.029		0.026	0.131	0.141	0.144	0.130	0.238	0.236	0.229	0.215	0.236	0.376	0.218	0.209	0.216	0.212	0.228	0.240	0.223	0.521	0.519	0.560	0.515	0.446	0.611	0.649	
4	TOSV_France_Marseille_DQ462405	0.038	0.038	0.025		0.125	0.125	0.125	0.121	0.246	0.254	0.254	0.228	0.232	0.206	0.232	0.228	0.213	0.210	0.243	0.228	0.213	0.471	0.460	0.433	0.423	0.429	0.520	0.636	
5	TOSV_H/IMTSSA_FJ153286	0.168	0.168	0.149	0.114		0.008	0.022	0.005	0.245	0.245	0.241	0.204	0.198	0.207	0.234	0.228	0.204	0.201	0.240	0.226	0.204	0.463	0.466	0.424	0.444	0.452	0.540	0.627	
6	TOSV_France_AR_EF656361	0.226	0.180	0.242	0.114	0.000		0.036	0.012	0.246	0.248	0.241	0.199	0.228	0.380	0.218	0.217	0.205	0.212	0.246	0.259	0.214	0.522	0.524	0.567	0.510	0.457	0.609	0.652	
7	TOSV_Spain_EsPHGR40_EF120631	0.229	0.165	0.247	0.101	0.020	0.071		0.017	0.240	0.245	0.238	0.185	0.216	0.382	0.226	0.217	0.208	0.212	0.233	0.258	0.216	0.531	0.529	0.571	0.518	0.452	0.608	0.649	
8	TOSV_Spain_AY705933	0.134	0.167	0.113	0.101	0.010	0.007	0.014		0.252	0.248	0.245	0.192	0.227	0.217	0.234	0.229	0.215	0.213	0.246	0.244	0.215	0.499	0.505	0.457	0.483	0.462	0.566	0.631	
9	Massilia_W_EU725773	0.327	0.309	0.332	0.266	0.267	0.327	0.321	0.310		0.058	0.046	0.199	0.199	0.251	0.238	0.243	0.227	0.247	0.210	0.258	0.234	0.476	0.479	0.450	0.481	0.409	0.552	0.659	
10	Massilia_BM_DQ656077	0.258	0.250	0.250	0.278	0.207	0.215	0.207	0.217	0.076		0.012	0.206	0.202	0.236	0.230	0.233	0.215	0.236	0.218	0.242	0.215	0.451	0.445	0.435	0.482	0.397	0.515	0.619	
11	Massilia_BP_DQ656078	0.239	0.242	0.242	0.278	0.198	0.196	0.198	0.209	0.066	0.011		0.204	0.201	0.231	0.229	0.232	0.214	0.235	0.210	0.238	0.214	0.451	0.444	0.426	0.481	0.394	0.508	0.615	
12	PNQV_P6B2_2008_GQ155520	0.227	0.241	0.218	0.190	0.238	0.227	0.244	0.235	0.261	0.217	0.220		0.018	0.227	0.253	0.244	0.192	0.226	0.228	0.217	0.192	0.465	0.471	0.450	0.465	0.425	0.515	0.605	
13	PNQV_P1B4_2008_FJ848987	0.332	0.317	0.337	0.203	0.218	0.316	0.321	0.268	0.286	0.207	0.209	0.017		0.251	0.268	0.255	0.210	0.248	0.231	0.246	0.221	0.479	0.484	0.472	0.472	0.425	0.556	0.636	
14	SFNV_Poona_HM566178	0.581	0.295	0.569	0.215	0.198	0.560	0.566	0.239	0.337	0.247	0.239	0.244	0.316		0.155	0.172	0.166	0.003	0.215	0.258	0.169	0.556	0.551	0.491	0.562	0.429	0.635	0.654	
15	Cyprus_R3_EF201832	0.301	0.295	0.316	0.266	0.277	0.316	0.316	0.261	0.357	0.250	0.253	0.269	0.383	0.240		0.072	0.133	0.155	0.200	0.247	0.136	0.458	0.464	0.435	0.489	0.437	0.564	0.659	
16	SFNV_Namru_840055_EF201828	0.291	0.281	0.306	0.253	0.277	0.332	0.311	0.261	0.367	0.239	0.242	0.244	0.327	0.255	0.117		0.129	0.172	0.205	0.240	0.120	0.458	0.468	0.439	0.481	0.437	0.568	0.652	
17	SFNV_Sabin_Italy_EF201829	0.316	0.302	0.311	0.253	0.228	0.286	0.286	0.239	0.347	0.207	0.209	0.185	0.286	0.219	0.173	0.163		0.165	0.197	0.238	0.000	0.482	0.483	0.456	0.483	0.412	0.561	0.645	
18	SFNV_India_P-7101795_EF201830	0.327	0.295	0.306	0.215	0.198	0.286	0.296	0.239	0.337	0.239	0.242	0.244	0.316	0.000	0.240	0.255	0.219		0.218	0.253	0.169	0.478	0.470	0.432	0.490	0.434	0.568	0.627	
19	TEHV_I47_GQ165523	0.266	0.269	0.269	0.253	0.257	0.275	0.259	0.269	0.259	0.247	0.228	0.333	0.343	0.257	0.222	0.250	0.269	0.259		0.203	0.197	0.463	0.476	0.425	0.486	0.434	0.528	0.631	
20	SFNV_Yugoslavia_YU8-76_EF2018	0.327	0.302	0.327	0.253	0.267	0.357	0.347	0.289	0.403	0.250	0.253	0.303	0.383	0.352	0.347	0.327	0.337	0.352	0.269		0.231	0.485	0.481	0.456	0.480	0.449	0.587	0.636	
21	SFNV_Sabin_Italy_AY705944	0.246	0.246	0.239	0.253	0.228	0.232	0.225	0.239	0.310	0.207	0.209	0.185	0.218	0.169	0.113	0.099	0.000	0.169	0.269	0.275		0.476	0.485	0.459	0.499	0.412	0.542	0.637	
22	SFSV_Sabin_EF201822	0.746	0.606	0.756	0.570	0.564	0.751	0.752	0.634	0.686	0.581	0.587	0.597	0.644	0.765	0.654	0.634	0.665	0.660	0.587	0.654	0.627		0.073	0.551	0.325	0.466	0.580	0.654	
23	Cyprus_virus_GU119908	0.747	0.606	0.748	0.570	0.554	0.747	0.743	0.627	0.686	0.581	0.587	0.588	0.654	0.761	0.670	0.649	0.660	0.649	0.606	0.665	0.620	0.126		0.568	0.332	0.460	0.580	0.644	
24	RVFV_NC014395	0.741	0.567	0.737	0.500	0.490	0.745	0.746	0.572	0.619	0.506	0.500	0.543	0.624	0.714	0.624	0.619	0.630	0.614	0.505	0.582	0.587	0.713	0.735		0.548	0.461	0.627	0.702	
25	CFUV_PaAr814_EF201821	0.732	0.613	0.733	0.557	0.545	0.722	0.719	0.620	0.681	0.602	0.598	0.597	0.618	0.744	0.681	0.660	0.665	0.649	0.606	0.670	0.641	0.446	0.439	0.719		0.402	0.576	0.662	
26	ARBV_Ph1_35M6_GQ165524	0.618	0.625	0.614	0.600	0.624	0.618	0.636	0.636	0.614	0.564	0.551	0.602	0.602	0.596	0.602	0.614	0.568	0.602	0.629	0.636	0.568	0.607	0.607	0.581	0.551		0.471	0.676	
27	UUKV_M33551	0.809	0.748	0.809	0.714	0.701	0.813	0.813	0.732	0.741	0.670	0.667	0.670	0.730	0.823	0.767	0.751	0.762	0.741	0.724	0.767	0.732	0.764	0.775	0.792	0.767	0.581		0.679	
28	Gouleako_virus_A5CI_2004_HQ541	0.897	0.922	0.900	0.892	0.870	0.889	0.897	0.879	0.907	0.884	0.894	0.899	0.907	0.879	0.901	0.907	0.914	0.901	0.910	0.901	0.902	0.865	0.856	0.925	0.885	0.915	0.921		
																													<i>Amino acid sequences</i>	



Technical Appendix Figure. Phenology of *Phlebotomus* spp. sandflies collected in Utique, Governorate of Bizerte, Tunisia, 2010.