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FIRST REPORT OF *RETICULITERMES FLAVIPES* (ISOPTERA: RHINOTERMITIDAE) IN ITALY

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The first record of *Reticuliterms flavipes* (Kollar) (Isoptera: Rhinotermitidae) in Europe was in 1837, in Vienna, Austria, after infested plants imported from the U.S. were discovered in the greenhouse of the Schönbrunn Palace (Kollar 1837). In 1924, *R. flavipes* was found on the French Atlantic coast and initially described as a new species, *R. santonensis* (Feytaud 1924). The synonymy of *R. santonensis* with *R. flavipes* was eventually confirmed by mitochondrial DNA analyses (Austin et al. 2002). In France, *R. flavipes* is currently distributed in an area extending from the Gironde region up to Paris and Normandy, and causes structural damage to buildings and trees (Lohou et al. 1997). During the 1930s, *R. flavipes* was discovered in wooden forepoles of channel construction in the steam heating district of Hamburg, Germany, where populations were supported by the favorable microclimate (Weidner 1937). Today, populations of *R. flavipes* remain established in Hamburg, and cause damage to buildings and trees (Hertel & Plarre 2006).

In Oct 2008, a subterranean termite infestation was discovered by a homeowner in a detached house and adjacent garden situated in a residential district built in the 1970s in the outskirts of Olgiate Olona (Varese), in northern Italy. Termite workers and soldiers were observed and collected during a structural inspection in Nov 2008. Specimens are maintained in the Marini termite collection at the University of Bologna.

Molecular analysis was used to determine the termite species, which were preserved in 100% ethanol prior to DNA extraction. A 684-bp region of the mitochondrial cytochrome oxidase subunit II gene and a 491-bp region of the mitochondrial 16S ribosomal RNA gene were amplified by PCR. Sequencing was performed by Macrogen Inc. (Seoul, South Korea). Closely related sequences were identified from GenBank using the BLAST network service (Altschul et al. 1990) at NCBI.

For both genes, nucleotide sequences were identical in the 2 workers (GenBank Accession GU070788 and GU070789). Sequences from the Olgiate Olona house corresponded (97-100% coverage, 100% similarity for COII sequence; 92-100% coverage, 100% similarity for 16S sequence) to GenBank sequences of *R. flavipes* from North America and France and of *R. arenincola* Goellner (Table 1). This latter species appears to be identical to *R. flavipes* based on the DNA sequences obtained so far.

TABLE 1. GENBANK SEQUENCES MATCHING OLGIATE OLONA COII AND 16S SEQUENCES.

GenBank Accession No.	Species	Location	Sequence Type
AY168210	*R. flavipes*	W. Lafayette (Indiana - USA)	COII
AY536415	*R. flavipes*	W. Lafayette (Indiana - USA)	COII
AF291742	*R. santonensis*	Biscarrosse (France)	COII
AY512590	*R. santonensis*	Royan (France)	COII
EF206315	*R. santonensis*	Elevage Dijon (France)	COII
EU253889	*R. santonensis*	(*)	COII
AF525353	*R. arenincola*	Indiana - USA	COII
AY168209	*R. arenincola*	Dune Acres (Indiana - USA)	COII
AY453589	*R. arenincola*	Indiana - USA	COII
AY168228	*R. flavipes*	W. Lafayette (Indiana - USA)	16S
AF292025	*R. santonensis*	Biscarrosse (France)	16S
AY808127	*R. santonensis*	Tussac (France)	16S
EF206315	*R. santonensis*	Elevage Dijon (France)	16S
FJ806149	*R. santonensis*	(*)	16S
AY168226	*R. arenincola*	Dune Acres (Indiana - USA)	16S

* = locality not listed.

In North America, 47 16S haplotypes of *R. flavipes* have been described (Austin et al 2005a). *Reticulitermes flavipes* in France shows only 4 haplotypes (F, M and GG in Austin et al. 2005b, and another haplotype in Marini & Mantovani 2002), all of which can be found in North America, so it can be assumed that the European *R. flavipes* is allochthonous (non-native) (Austin et al. 2005a). French haplotypes can be found within or near the Mississippi River basin region of the U.S. once belonging to the French colonial empire in North America. In particular, 3 French haplotypes occur in Louisiana and Arkansas, and 2 French haplotypes are in Mississippi, Texas, Kansas, Oklahoma, Iowa, and Indiana (Austin et al. 2005a). Introduction of *R. flavipes* to France might date from the colonial period.

The Olgiate Olona sample shares the same 16S haplotype with French and USA populations (Table 1). Even though the possibility of an American origin for the Olgiate Olona population cannot be ruled out, it seems much more likely that *R. flavipes* was introduced to Italy from France because of the geographical proximity and history of trade activity between the 2 countries.

The human-aided introduction of *R. flavipes* to non-endemic regions of the world, such as Olgiate Olona, should be carefully monitored in order to identify and treat new infestations to prevent future introductions, especially because *R. flavipes* is a major structural pest wherever it has been introduced.

Summary

An existing infestation of subterranean termites in and around a home in northern Italy was genetically determined to be the Nearctic species, *Reticulitermes flavipes* (Kollar) (Isoptera: Rhinotermitidae). This is the first report of an established *R. flavipes* population in Italy. The source of the *R. flavipes* introduction is unknown.

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