

Prokelisia marginata (Van Duzee, 1897) lands on the French coast of Normandy (Hemiptera, Fulgoromorpha, Delphacidae)

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Abstract. – The Nearctic species *Prokelisia marginata* (Van Duzee, 1897) is recorded for the first time in France, along the English Channel. It was found on *Spartina anglica* C. E. Hubb. (Poaceae), which is not its original host but a well established cord-grass on that coast. An account is given on the actual known distribution of *P. marginata* throughout Europe.

Résumé. – *Prokelisia marginata* (Van Duzee, 1897) débarque en France sur les plages normandes (Hemiptera, Fulgoromorpha, Delphacidae). L'espèce néarctique *Prokelisia marginata* (Van Duzee, 1897) a été observée pour la première fois en France, sur la côte normande. On la trouve sur *Spartina anglica* C. E. Hubb., Poaceae abondante sur ce littoral, mais qui n'est pas sa plante hôte originelle. La progression de *P. marginata* en Europe et sa distribution actuelle sont discutées.

Keywords. – Auchenorrhyncha, new record, France, *Spartina*, cord-grass, planthopper.

Prokelisia marginata (Van Duzee, 1897) has been described as *Megamelus marginatus* from several specimens collected in salted marshes in the states of New-Jersey and New-York (USA) (VAN DUZEE, 1897). This is one of the rare Planthopper species to live in the tide zone. During high tide, the adult is even able to remain under the sea level in enclosing air bubbles under its wings and resting in the inner folded part of the basal portion of the plant blades (ARDNT, 1914). The insect can also remain at the surface of the sea and even jump on it with the help of its modified flat metatibial spur. Originating from the only east coast of the USA, the species is recorded from both seaboard (VAN DUZEE, 1917) on its host *Spartina alterniflora* Loisel. (Poaceae). This Nearctic Planthopper has been introduced almost twenty years ago in Europe (SELJAK, 2004), where it has been found first on *Spartina maritima* (Curtis) Fernald in Portugal (Wilson, unpublished data).

TAXONOMY AND NATIVE RANGE

The delphacid genus *Prokelisia* has been established by OSBORN (1905) and contains five species originally distributed in North America, two of them feeding exclusively on cord-grasses (DENNO *et al.*, 1987). The taxonomy of the genus has been revised by WILSON (1982), where key and descriptions are provided for all species, as well as States records for the USA. Any new finding in Europe of a delphacid species on *Spartina* could be easily diagnosed and the identification of *P. marginata* easily confirmed using this key.

HOST-PLANTS

The original host-plant for *P. marginata* is *Spartina alterniflora* Loisel. (DENNO *et al.*, 1987). The introduction of the insect in Europe shows his ability to shift on closely related plants. *Spartina maritima* (Curtis) Fernald was the only known native cord-grass species in the Old World. The East American *S. alterniflora* was accidentally introduced in southern England and western France by the end of the 19th century (AINOUCHE *et al.*, 2009). The hybridization of those species gave a sterile hybrid *S. × townsendii* H. Groves & J. Groves. After 1890,



Fig. 1. – Salted marsh showing the Cord-grass *Spartina anglica* C. E. Hubb. in Baie des Veys, Brévands, Manche.

parasites or pathogens of the cordgrass, like fungi, may threaten the subsistence of the plant (BADMIN & WITTS 2009; BLAUWE, 2011). Where the *S. alterniflora* has become an invasive species, especially on the Pacific coast of the USA, the planthopper has been introduced for biological control of this Poaceae (GREVSTAD *et al.*, 2003), but also on the introduced populations of the European *S. anglica* in North America (WU *et al.*, 1999).

REPORTED INTRODUCTIONS IN EUROPE

The published data about the introduction of *P. marginata* in Europe relate only to Slovenia (SELJAK, 2004), United Kingdom (WILSON & MÜHLETHALER, 2009; BADMIN & WITTS, 2009; DENTON, 2010; BADMIN, 2010), the Netherlands and Belgium (BLAUWE, 2011). Other discoveries in Portugal, Spain and France have been only reported from unpublished communications (MIFSUD *et al.*, 2010). Table I gives a full account on the published and reported data in Europe. A high abundance has been reported for the populations of South England (Dorset to Kent) in 2009 and Belgium in 2010 (BLAUWE, 2011) as well as in the Netherlands (BIEMAN *in* BLAUWE, 2011). On the contrary, we observed very low population levels on the Normandy coast (this study), and BADMIN (2010) reported a decrease of the *P. marginata* density in Kent during summer 2010, probably due to a long period of cold weather before spring.

RECORDS IN FRANCE

All the specimens are deposited in the Muséum national d'Histoire naturelle, in Paris (MNHN), and in The Natural History Museum, in London (NHM).

MANCHE (50), Brévands, baie des Veys: 22.IX.2009, A. Soulier-Perkins, several nymphs (MNHN, NHM); 5.VI.2010, D. Ouvrard, 2 ♀ (NHM); 22.IX.2010, A. Soulier-Perkins, 1 ♀ (MNHN). All specimens collected on *Spartina anglica*.

in England a fertile plant was recorded and appeared to have resulted from a chromosome doubling of the hybrid *townsendii* (MARCHANT, 1963). This new allopolyploid species was named *S. anglica* C. E. Hubb. and colonized rapidly the salt marshes and estuaries of England and France (AINOUCHE *et al.*, 2009). In Slovenia, *P. marginata* has always been collected on *S. maritima* (SELJAK, 2004) whereas in Great Britain, it has been collected on *S. anglica* (BADMIN & WITTS, 2009). In this report, the insects were collected on *S. anglica* in France (fig. 1).

RESEARCH ON *P. MARGINATA*

A substantial amount of ecological research has been conducted in the USA on this delphacid species as reported by DENNO *et al.* (1987), mainly because of its host range restriction to an emblematic and usually only inhabiting plant of salt marshes. Furthermore, *Spartina* is known to prevent the erosion of fragile salt marsh ecosystems. But in Europe, the association of this phloem sucking insect with other

Table I. – Reports on the introduction of *Prokelisia marginata* in Europe.

Location	Publication	<i>Spartina</i> species	Collecting year
Portugal (Algarve)	Unpublished (WILSON <i>in</i> SELJAK, 2004)	Not available	1994 (MIFSUD <i>et al.</i> , 2010)
Spain	Unpublished (WILSON <i>in</i> MIFSUD <i>et al.</i> , 2010)	Not available	1998
Slovenia (Lazaret & Seča)	SELJAK (2004)	<i>S. maritima</i>	2003, 2004
United Kingdom (Hampshire)	WILSON & MÜHLETHALER (2009)	Not available	2008
United Kingdom (Kent)	BADMIN & WITTS (2009); BADMIN (2010)	<i>S. anglica</i>	2009, 2010
UK (Dorset, Isle of Wight, Sussex)	DENTON (2010)	Not available	2009
France	Unpublished (reported <i>in</i> MIFSUD <i>et al.</i> , 2010)	Not available	2009 (MIFSUD <i>et al.</i> , 2010)
Netherlands	BLAUWE (2011)	<i>S. anglica</i> or <i>S. × townsendii</i>	2011 (probably introduced in 2010)
Belgium	BLAUWE (2011)	<i>S. anglica</i>	2011

DISCUSSION AND CONCLUSION

The observed spread of *P. marginata* on *Spartina* both in South and North Europe between 1994 and 2012 shows a remarkable ability for this insect to adapt to different *Spartina* species, especially to the European native *S. maritima*, but also to *S. anglica* and *S. × townsendii*. This observation is in accordance with the molecular phylogeny published by BAUMEL *et al.* (2002), where *S. alterniflora* and *S. maritima* belong to the same clade. It would be worth looking for the presence of *P. marginata* also on the South American *S. densiflora* Brongn. established in Portugal and Spain, as well as the endangered *S. × neyrautii* Foucaud which is genetically very close to *S. × townsendii* (BAUMEL *et al.*, 2003). Table II shows the GBIF (Global Biodiversity Information Facility) occurrences of *Spartina* spp. in other European countries where *P. marginata* has not been recorded yet. The discovery or the absence of *P. marginata* on *S. pectinata* Bosc ex Link or *S. cynosuroides* (L.) Roth (belonging to another clade as shown by BAUMEL *et al.*, 2003) in Germany, Ireland or Sweden would inform us on the adaptive power of the Planthopper to less related *Spartina* spp. Furthermore, several studies (SELJAK, 2004; BADMIN & WITTS, 2009; DENTON, 2010; BLAUWE, 2011; this study) shows a high variability in the size of *P. marginata* different populations but also in the size of successive populations. It would be worth monitoring carefully the association of the cord-grass Planthopper with the different *Spartina* species all along the European coasts. Where already endangered, or among small populations of *S. maritima*, the degree of invasiveness of *P. marginata* has to be estimated for a conservation purpose. Both studies of host-shift capabilities and associated fauna on *Spartina* should be undertaken in the future.

Table II. – *Spartina* spp. present in countries where the cord-grass Planthopper has not been recorded yet (data from the GBIF).

	Denmark	Germany	Ireland	Italy	Sweden
<i>S. maritima</i>			X	X	
<i>S. × townsendii</i>	X	X	X		
<i>S. anglica</i>	X	X	X		
<i>S. pectinata</i>		X	X		
<i>S. cynosuroides</i>					X
<i>S. alterniflora</i>	X				

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