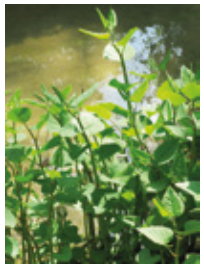
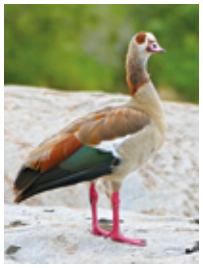
Book of Abstracts

Christian Ries & Yves Krippel (eds)

NEOBIOTA 2016

Biological Invasions: Interactions with Environmental Change

9th International Conference on Biological Invasions


Vianden, Luxembourg
14 - 16 September 2016

www.neobiota2016.org

Fonds National de la Recherche Luxembourg

Supported by the Fonds National de la Recherche, Luxembourg
(Project Code 11253560)

Friday, 16 September 2016 - 16:45 - 18:30

Session 10
Eradication, management & control of invasive species

Topic continued from previoous session

Fr-S10-01

Spread of *Vespa velutina* in Italy: natural diffusion, human-mediated dispersion and monitoring intensity to improve the management activities

Simone Lioy, Marco Porporato, Daniela Laurino, Aulo Manino, Sandro Bertolino

Department of Agricultural, Forest and Food Sciences, University of Turin, Grugliasco, Italy

Vespa velutina Lepeletier 1836 is an Asiatic hornet species introduced in France in 2004. The species quickly colonized many European countries, such as Spain, Portugal, Belgium, Italy and Germany; in Italy first nests were discovered in 2013 in the northwest part of the country. *V. velutina* actively preys honeybees and wild insects, and could exert a negative impact on apiculture, natural ecosystems and human well-being. For these reasons, monitor and control activities recently started in Italy thanks to the work of many beekeepers and volunteers, together with a European Life Project (LIFE14 NAT/IT/001128 STOPVESPA) which aims to develop new tools and methods for controlling the species.

V. velutina could spread by natural diffusion or through passive transports of inseminated queens. In the first case the spread will be progressive and predictable, while human-mediated transports leads to the unpredictable colonization of areas even far away from the current distribution range.

Aims of this work are: *i)* reconstruct the spread of *V. velutina* since his arrival in Italy and establish a method to disentangle the natural diffusion from human-mediated transportation; *ii)* define buffer zones with different monitor and control intensity around the current Italian distribution range of the species with different likelihood of nests probability. The analyses were performed based on nests distribution, cluster analysis and nearest neighbour analysis of nests in respect to possible source sites of the previous year.

The range of the species increased exponentially from 205 km^2 in 2013 to 346 km^2 in 2014 and 930 km^2 in 2015 (R^2 =0.97; F =32; p =0.11). The mean linear spread rate was 18.3 ± 3.3 km/year, and follows a linear trend (R^2 =0.99; F =200; p <0.05). A cluster analysis of nests distribution allowed to identify 17 core-areas enclosing 90% of the nests in 57 km^2, with a mean nest density of 2.9-3.5 nests/km^2. Over this threshold the inclusion of others nest quickly increased the overall area.

Mean distances of nests observed in 2015 from possible source sites were used to define areas were the species could naturally spread in 2016. The estimated probabilities were: 33.5% within 500 m from the current range, 52.5% within 1 km, 75.1% within 2 km, 92.3% within 5 km and 97.7% within 10 km. Three expansion models were then elaborated at 700, 900 and 1200 m a.s.l., considering the altitude limits were nests and adults were observed.

These results could be used to improve the effectiveness of *V. velutina* control, and better focusing possible expansions areas.

Keywords: Asian yellow-legged hornet, domestic and wild bees, range analysis, species distribution, drivers and pathways, monitoring intensity