Fragmenta entomologica, 47 (1): 51-52 (2015)

eISSN: 2284-4880 (online version)
pISSN: 0429-288X (print version)

Review article
Submitted: May 24th, 2015 - *Accepted*: June 22th, 2015 - *Published*: June 30th, 2015

Monitoring of insects with public participation (MIPP; EU LIFE project 11 NAT/IT/000252): overview on a citizen science initiative and a monitoring programme (Insecta: Coleoptera; Lepidoptera; Orthoptera)

Franco MASON [1], Pio Federico ROVERSI [2], Paolo AUDISIO [3], Marco Alberto BOLOGNA [4], Giuseppe Maria CARPANETO [4], Gloria ANTONINI [3], Emiliano MANCINI [4], Giuseppino SABBATINI PEVERIERI [2], Fabio MOSCONI [2,3], Emanuela SOLANO [2,3], Emanuela MAURIZI [2,4], MICHELA MAURA [2,4], Stefano CHIARI [2,4], Simone SABATELLI [3], Marco BARDIANI [2,5], Ilaria TONI [2,5], Lara REDOLFI DE ZAN [2,5], Sarah ROSSI DE GASPERIS [4], Massimiliano TINI [3,4], Alessandro CINI [2,6], Agnese ZAULI [4], Giulio NIGRO [3], Alessandro BOTTACCI [7], Sönke HARDERSEN [5], Alessandro CAMPANARO [2,5,*]

[1] *Corpo Forestale dello Stato, Centro Nazionale Biodiversità Forestale, Laboratorio Nazionale Tassonomia Invertebrati "Lanabit" - Via Carlo Ederle 16/a & Via Tomaso da Vico 1 - I-37100 Verona, Italy* - fmason@tin.it

[2] *CREA-ABP Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Centro di Ricerca per l'Agrobiologia e la Pedologia - Via Lanciola 12/A - I-50125 Cascine del Riccio (Florence), Italy* - piofederico.roversi@entecra.it; giuseppino.sabbatini@entecra.it

[3] *Department of Biology and Biotechnologies "Charles Darwin", Sapienza University of Rome - Via Alfonso Borelli 50 - I-00161 Rome, Italy* - paolo.audisio@uniroma1.it; gloria.antonini@uniroma1.it; emanuela.solano@uniroma1.it; simone.sabatelli@uniroma1.it; fabio.mosconi@gmail.com; giulionigro87@gmail.com

[4] *Department of Science, Roma Tre University - Viale Guglielmo Marconi 446 - I-00146 Rome, Italy* marcoalberto.bologna@uniroma3.it; giuseppe.carpaneto@uniroma3.it; emiliano.mancini@uniroma3.it; michela.maura.ita@gmail.com; agnese.zauli@uniroma3.it; massimiliano.tini@uniroma3.it

[5] *MiPAAF - National Forest Service, CNBF National Centre for Forestry Biodiversity "Bosco Fontana" - Strada Mantova 29 - I-46045 Marmirolo (Mantova), Italy* - bardianimarco@gmail.com; ilaria_toni@libero.it; lara.redolfi@gmail.com; s.hardersen@gmail.com; ale.naro@gmail.com

[6] *Department of Biology, University of Florence - Via Madonna del Piano 6 - I-50019 Sesto Fiorentino (FI), Italy* - cini.ales@gmail.com

[7] *Corpo Forestale dello Stato, Ufficio per la Biodiversità - Via G. Carducci 5 - I-00187 Rome, Italy* - a.bottacci@corpoforestale.it

***** Corresponding author: ale.naro@gmail.com

Abstract

The LIFE project "MIPP" - Monitoring of Insects with Public Participation (11 NAT/IT/000252) is focused on selected insect species (five Coleoptera, three Lepidoptera, one Orthoptera), all included in the annexes II and IV of the Habitats Directive (HD) 92/43/EEC. One important aim is a *citizen science* initiative where every person may become a citizen scientist and collect faunistic data on the above species throughout Italy. Another objective of the project MIPP is the development of standard methods for monitoring the conservation status of the five target beetle species. One innovative method employed is a sniffer-dog ("Osmodog"), trained to find the rare and endangered hermit beetle, *Osmoderma eremita*, which lives in veteran, hollow trees. The dog detects the strong smell of mature peach produced by adult males and an odor produced by the larvae. Another objective of the project MIPP is the dissemination of topics such as HD, Natura 2000, importance of dead-wood, Life projects, insect monitoring and conservation.

Key words: Habitats Directive, *Osmoderma eremita*, sniffer dog, invertebrate monitoring, biodiversity conservation.

Project presentation

The Life project "MIPP - Monitoring of Insects with Public Participation" (LIFE11 NAT/IT/000252) has as its major beneficiary, the Italian National Forest Service, Rome/ National Centre of Forest Biodiversity "Bosco Fontana". It will last five years (2012/2017), by involving five associated beneficiaries: Sapienza University of Rome, Roma Tre University, Italian Ministry of the Environment, Lombardy Region and the Council for Agricultural Research and Economic Analysis, Florence. The main objectives of the MIPP project are: 1) to develop efficient and low impact monitoring methods for the surveillance of the conservation status of five Italian flagship species of saproxylic beetles (Coleoptera): *Osmoderma eremita* s.l. (see Audisio et al. 2009), *Lucanus cervus* (Linnaeus, 1758), *Cerambyx cerdo* Linnaeus,

1758, *Rosalia alpina* (Linnaeus, 1758), *Morimus asper/funereus* s.l. (see Solano et al. 2013), all listed in the Annexes II and IV of the Habitats Directive (HD); 2) to involve citizens (e.g., excursionists, bikers, wildlife lovers, etc.) in the collection of data on nine rare and endangered insect species included in HD [the five beetle species listed above; three species of Lepidoptera: *Zerynthia* (*Zerynthia*) *polyxena/cassandra* s.l., *Parnassius apollo* (Linnaeus, 1758), *Lopinga achine* (Scopoli, 1763); and one Orthoptera: *Saga pedo* (Pallas, 1771)]; 3) to disseminate scientific and conservation issues to both children and adults, such as HD, Natura 2000, importance of dead-wood, Life projects, insect monitoring and conservation. Some actions of the project are focused on a sniffer-dog ("Osmodog") which is being trained for detecting the rare hermit beetle *Osmoderma eremita* (Scopoli, 1763). Males of *O. eremita* s.l. emit a characteristic fruity odour similar to ripening peach, which is a sexual pheromone, attractive to females. This chemical is used to bait specific traps for the monitoring of adults (Larsson et al. 2003; Chiari et al. 2014). Also the larvae seem to emit a genus-specific smell, which cannot be perceived by humans, but is detectable by dogs (Mosconi et al. unpublished data). Recently, dogs have been used to find pests and invasive invertebrate species of Coleoptera (Nakash et al. 2000; Hoyer-Tomiczek & Sauseng 2013), Hemiptera (Pfiester et al. 2008; Rolón et al. 2011), Hymenoptera (Lin et al. 2011) and Isoptera (Zahid et al. 2012). However, sniffer dogs are only rarely involved in nature conservation projects, e.g. surveying of some taxa, such as bumblebees (Waters et al. 2011). Employing trained dogs in zoological research can provide several advantages, such as a reduction of field efforts and costs for sampling, a reduction in disturbance to species as destructive sampling can be avoided (Zahid et al. 2012). Moreover, Osmodog is the main disseminating vehicle of the project and appears in the website ***www.lifemipp.eu***, social network, popular articles in newspapers and magazines, comic strips, radio and TV programs, and in other education activities. So far Osmodog has been proven to attract a large audience to the project. The project is testing the monitoring methods in five protected areas managed by the National Forest Service: the Casentino forests (Tuscany/Emilia Romagna), the Bosco Fontana Forest (Lombardy), the Tarvisio forest (Friuli-Venezia Giulia), the Bosco della Mesola forest (Emilia-Romagna), and the Castel di Sangro forests (Abruzzo). These areas are part of the Italian Natura 2000 network (SCIs and SPAs), and the data gathered will be used to produce a standard protocol for application at national level. In fact, the manuals containing the standard monitoring protocols of the five main target beetle species will be published in 2017, updating those recently summarized by Trizzino et al. (2013).

Acknowledgements – We thank the staff of the veterinary clinic Gregorio VII, Rome, chiefly Dr. M. Tommasini Degna and Dr. V. Di Marzio, for their valuable contribution to the MIPP project by monitoring the health of our golden retriever Osmodog. Moreover, we would like to thank all field assistants and volunteers who collaborated in the collection of data during the field sessions.

REFERENCES

Audisio P., Brustel H., Carpaneto G.M., Coletti G., Mancini E., Trizzino M., Antonini G., De Biase A. 2009. Data on molecular taxonomy and genetic diversification of the European Hermit beetles, a species complex of endangered insects (Coleoptera: Scarabaeidae, Cetoniinae, *Osmoderma*). Journal of Zoological Systematics and Evolutionary Research, 47(1): 88–95.

Chiari S., Zauli A., Mazziotta A., Luiselli L., Audisio P., Carpaneto G.M. 2013. Surveying an endangered saproxylic beetle, *Osmoderma eremita*, in Mediterranean woodlands: a comparison between different capture methods. Journal of Insects Conservation, 17: 171–181.

Chiari S., Zauli A., Audisio P., Carpaneto G.M. 2014. Interactions between larvae of the threatened saproxylic beetle *Osmoderma eremita* and other flower chafers in Mediterranean woodlands: implications for conservation. Insect Conservation and Diversity, 7 (5): 462–469. doi:10.1111/icad.12069

Hoyer-Tomiczek U., Sauseng G. 2013. Sniffer dogs to find *Anoplophora* spp. infested plants. In: Lozzia G.C. (Ed.): *Anoplophora chinensis* & *A. glabripennis*: new tools for predicting, detecting and fighting. How to save our forests and our urban green spaces. Journal of Entomological and Acarological Research, 45(1) Special Issue: 10–12.

Larsson M.J., Hedin J., Svensson G.P., Tolasch T., Francke W. 2003. The characteristic odour of *Osmoderma eremita* (Coleoptera: Scarabaeidae) identified as a male–released pheromone. Journal of Chemical Ecology, 29: 575–587.

Lin H.M., Chi W.L, Lin C.C., Tseng Y.C., Chen W.T., Kung Y.L., Lien Y.Y, Chen Y.Y. 2011. Fire ant-detecting canines: a complementary method in detecting red imported fire ants. Journal of Economic Entomology,104(1): 225–231.

Nakash J., Osem Y., Kehat M. 2000. A suggestion to use dogs for detecting red palm weevil (*Rhynchophorus ferrugineus*) infestation in date palms in Israel. Phytoparasitica, 28(2): 153–155.

Pfiester M., Koehler P.G., Pereira R.M. 2008. Ability of bed bug-detecting canines to locate live bed bugs and viable bed bug eggs. Journal of Economic Entomology, 101(4): 1389–1396.

Rolón M., Vega M.C., Román F., Gómez A., Rojas De Arias A. 2011. First report of colonies of sylvatic *Triatoma infestans* (Hemiptera: Reduviidae) in the Paraguayan Chaco, using a trained dog. Plos Neglected Tropical Disease, 5(5): e1026. doi:10.1371/journal.pntd.0001026.

Solano E., Mancini E., Ciucci P., Mason F., Audisio P., Antonini G. 2013. The EU protected taxon *Morimus funereus* Mulsant, 1862 (Coleoptera: Cerambycidae) and its western Palaearctic allies: systematics and conservation outcomes. Conservation Genetics, 14: 683–694.

Waters J., O'Connor S., Park K.J., Goulson G. 2011. Testing a detection dog to locate bumblebee colonies and estimate nest density. Apidologie, 42: 200–205.

Trizzino M., Audisio P., Bisi F., Bottacci A, Campanaro A., Carpaneto G.M., Hardersen S., Mason F., Nardi G., Preatoni D., Vigna Taglianti A., Zilli A., Cerretti P. 2013. Gli artropodi italiani in Direttiva Habitat: biologia, ecologia, riconoscimento e monitoraggio. Centro Nazionale per lo Studio e la Conservazione della Biodiversità Forestale "Bosco Fontana" di Verona. Conservazione Habitat Invertebrati, 7, 255 pp., Cierre Edizioni, Verona.

Zahid I., Grgurinovic C., Zaman T.K., De Keyzer R., Cayzer L. 2012. Assessment of technologies and dogs for detecting insect pests in timber and forest products. Scandinavian Journal of Forest Research, 27: 492–502.