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Lacewings and Citizen science in Italy: a young but very promising relationship

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Abstract. Citizen science is growing as a field of research with contributions from diverse disciplines, promoting innovation in science, society, and policy. Citizen science platforms (*i.e.*, iNat, https://www.inaturalist.org/) and capacity-building programmes foster the visibility of projects and establish networks for knowledge exchange within and among members of the citizen science community. Several recent events of citizen science in Italy (mainly by means of bioblitzes) have given a new perspective to the knowledge of Neuropterida in Italy.

Introduction

As a scientist, I have continuously been involved in training activities and in engaging the public in scientific subjects. Entomology, but more generally the dissemination of scientific knowledge, and social commitment have always been two sectors I have walked together. For this reason, one of the first objectives that I gave myself in the study of Neuropterida was to create a web site to disseminate information to an Italian audience: this web site (URL: http://neurotteri.casaccia.enea.it/), online since 2000, has been updated to 03.viii.2018. From the beginning, it has been perfectly clear to me that researchers benefit from using the Internet on a one-to-one basis (e-mail, File Transfer Protocol), a one-to-many basis (discussion groups, Internet conferences), and from accessing large databases of knowledge (Young et al. 2014).

Although only a few researchers have devoted themselves intensely to the study of Neuropterida in Italy, collaboration with many colleagues has led to a widespread and more in-depth knowledge. Meanwhile, several of us have also dedicated ourselves to the dissemination of scientific knowledge by creating basic texts, contributing to the knowledge of the value of biodiversity, in addition to establishing and taking care of a vast audience of people who have contributed over time to help document the presence of Neuropterida in nature (Nicoli Aldini 2007; Pantaleoni et al. 2011; Letardi 2016). This convergence of interests between a wide audience of naturalists, who through various web media (Forums, Social Media, Mailing Lists), send daily comments, often accompanied by photographs, has enabled us, the Italian specialists of Neuropterida, to greatly accelerate the advance of knowledge of these insects for Italy and beyond. But this collaboration between entomologists and passionate nature photographers has not exhausted our intention for wider engagement, and the citizen science sector has always opened up new and promising developments (McKinley et al. 2017; Tredick et al. 2017).

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Materials and methods

In order to quantify the recent contribution that active citizenship has provided to the development of knowledge in the neuropterological field, data collected between 2014 and 2017 has been analysed. Every semester, I am collecting, from the main Italian entomological and naturalist forums, social media and other sources, reports relating to species of Neuropterida photographed in Italy. Each report is evaluated by expert entomologists and only those deemed plausible are recorded.

Results and discussion

Within the four years, a total of 570 valid reports were collected, relating to 82 taxa – almost half of the Italian species of Neuropterida. Of these, almost 500 were attributed to species level, whereas the remaining 70 were only able to be determined to genus level (Table 1). As was expected, the owly sulphur *Libelloides coccajus* (Denis & Schiffermüller, 1775) and the spotted antlion *Distoleon tetragrammicus* (Fabricius, 1798) are the most frequently photographed species; some other common antlions, owlflies, green and brown lacewings, the inocellid snakefly *Parainocellia bicolor* (A. Costa, 1855) and the charismatic mantidfly *Mantispa styriaca* (Poda, 1761) are also frequently photographed. Huge numbers of photographs of the common green lacewing, *i.e.*, the *Chrysoperla* species-complex were received, a group very rarely determinable to species level on the basis of a photograph: nevertheless some species of that complex are listed in Table 1.

An elaboration of the regional distributions of the photographic records is illustrated in Figure 1. Considering the high biodiversity of Neuropterida in that region (Letardi & Scalercio 2018), we must regard Calabria as an underestimated area by our naturalist photographers.

Between 2014 and 2017, almost all the families of Neuropterida present in Italy have been reported by the Italian naturalist photographers, except for Dilaridae and Berothidae; however, more than three-quarters of the total number of reports are antlions, owlflies or green lacewings (Fig. 2).

From analysing the data of the four-year period, it can be observed that the reports often refer to the same year that the photo was taken, or to the years just before (Fig. 3). Therefore unlike the study of museum material this source of information provides updated data on the current state of the habitats from which these reports come from.

Results of this survey give a useful contribution to updated knowledge about the regional distribution of Neuropterida in Italy.

Nevertheless, if the 'parterre' of naturalist photographers has greatly expanded in Italy in recent decades resulting in hundreds of reports every year for a group of insects considered 'minor' like the Neuropterida, the primary task of every scientist of this country should not be forgotten, *i.e.*, to contribute to the growth of a basic collective knowledge of the value of biodiversity in Italy.

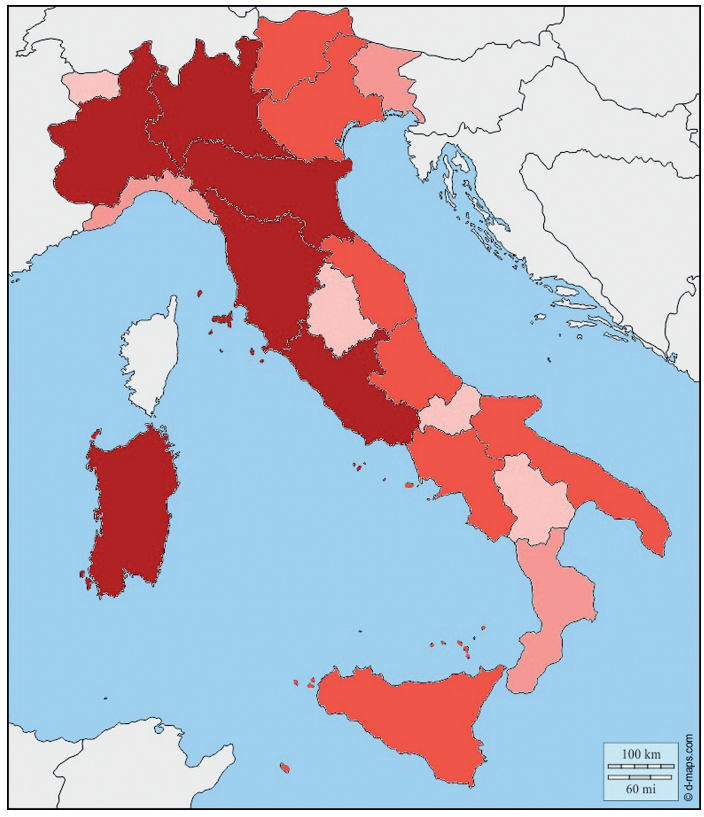

Figure 1. Regional distribution of photographic records in the four years 2014–2017 of the Italian species of Neuropterida. The different shades of red indicate: Pale pink – < 10 records; pink – 10–19 records; light red – 20–39 records; dark red – > 40 records.

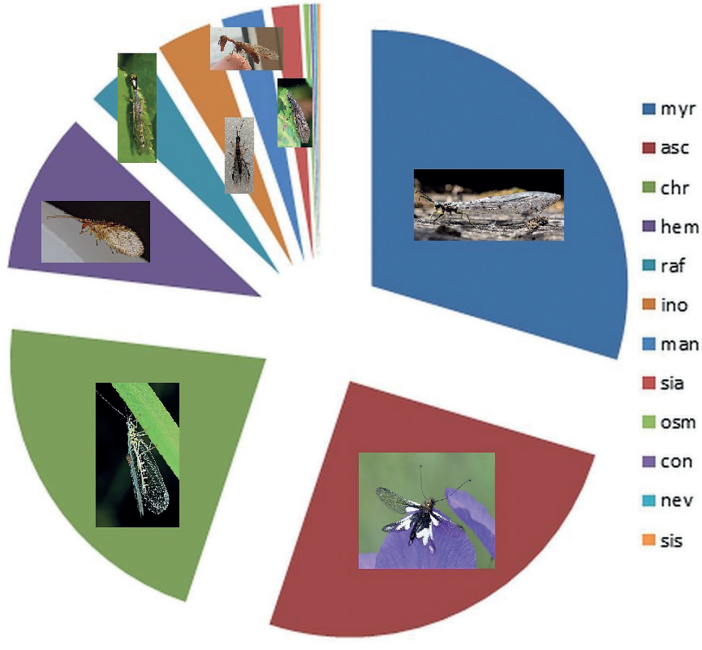

Figure 2. Frequency of photographic records 2014– 2017 of the different families of Neuropterida in Italy.

Table 1. Frequency of specific photographic reports of the Italian species of Neuropterida in the four-year period 2014–2017. +++ – more than 40 times; ++ – between 10 and 20 times; + – less than ten times but on average more than one time per year; +/- – more than one time per year on average but more than one record; r – only one record in the four-year period 2014–2017.

Species	frequency	Species	frequency
Libelloides coccajus	+++	*Neuroleon microstenus*	+/-
Distoleon tetragrammicus	+++	*Pseudomallada flavifrons*	+/-
Palpares libelluloides	++	*Chrysopa pallens*	+/-
Libelloides longicornis	++	*Chrysoperla agilis*	+/-
Libelloides latinus	++	*Dichrostigma flavipes*	+/-
Macronemurus appendiculatus	++	*Hemerobius lutescens*	+/-
Parainocellia bicolor	++	*Hemerobius micans*	+/-
Chrysopa perla	++	*Hemerobius stigma*	+/-
Micromus angulatus	++	*Mantispa aphavexelthe*	+/-
Libelloides lacteus	++	*Nineta principiae*	+/-
Italochrysa italica	++	*Osmylus fulvicephalus*	+/-
Mantispa styriaca	++	*Peyerimhoffina gracilis*	+/-
Synclisis baetica	++	*Pseudomallada inornatus*	+/-
Euroleon nostras	+	*Sympherobius fallax*	+/-
Xanthostigma corsicum	+	*Sympherobius pygmaeus*	+/-
Chrysoperla pallida	+	*Venustoraphidia nigricollis*	+/-
Gymnocnemia variegata	+	*Wesmaelius quadrifasciatus*	+/-
Acanthaclisis occitanica	+	*Bubopsis agrionoides*	r
Creoleon lugdunensis	+	*Chrysopa viridana*	r
Deleproctophylla australis	+	*Chrysopidia ciliata*	r
Libelloides corsicus	+	*Conwentzia* sp.	r
Nothochrysa capitata	+	*Distoleon annulatus*	r
Raphidia mediterranea	+	*Drepanepteryx algida*	r
Chrysoperla lucasina	+	*Hemerobius atrifrons*	r
Drepanepteryx phalaenoides	+	*Hemerobius gilvus*	r
Hemerobius humulinus	+	*Libelloides macaronius*	r
Megistopus flaviconis	+	*Megalomus* cf. *hirtus*	r
Myrmecaelurus trigrammus	+	*Megalomus tortricoides*	r
Pseudomallada prasinus	+	*Myrmeleon gerlindae*	r
Dendroleon pantherinus	+/-	*Neuroleon nemausiensis*	r
Fibla maclachlani	+/-	*Nevrorthus fallax*	r
Myrmeleon formicarius	+/-	*Nineta flava*	r
Chrysopa formosa	+/-	*Nothochrysa fulviceps*	r
Chrysopa walkeri	+/-	*Phaeostigma notatum*	r
Creoleon plumbeus	+/-	*Psectra diptera*	r
Hypochrysa elegans	+/-	*Puncha ratzeburgi*	r
Libelloides siculus	+/-	*Sialis lutaria*	r
Micromus variegatus	+/-	*Sisyra terminalis*	r
Myrmeleon hyalinus	+/-	*Sympherobius luqueti*	r
Myrmeleon inconspicuus	+/-	*Wesmaelius malladai*	r
Neuroleon arenarius	+/-	*Wesmaelius subnebulosus*	r

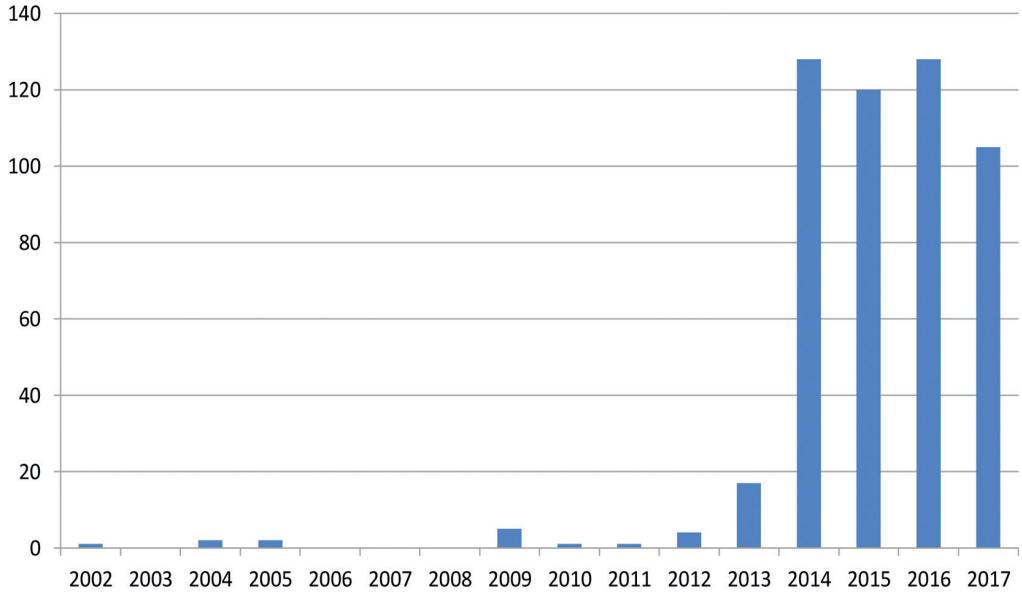

Figure 3. Number of records of Neuropterida species per year in Italy.

Everything started from the classic question: how often does the public get to see scientists having fun doing science? And what if everyone who comes to watch, young or old, went away with a much better understanding of biodiversity? This happens every year in many North American, Australian, and European locations. It's called a BioBlitz. From 2012, I have dedicated myself to all the bioblitzes that I have been able to attend. Since then, every year, I have attended 3–5 events of this kind, these have had an extremely varied participation (from hundreds of people to a few couples with children), with school groups, organized groups and occasionally single people (Fig. 4). Throughout these years, and thanks to this type of engagement between science and citizenship, I have established a wide network of relationships that have often continued even after the event itself. Over time, this commitment of mine has always convinced me that, overall, the innovative potential of citizen science should embrace the manifold expertise of participants with different backgrounds across different disciplines, and should incorporate opportunities to work at the science-policy interface and thereby gaining new perspectives. Citizen science needs to be considered as a suitable approach to face general issues like global challenges as well as basic knowledge about insects (Hecker et al. 2018).

A crucial aspect is certainly the role that this approach can bring to the diffusion of knowledge on Neuroptera in Italy. In this sense the choices for optimal communication are crucial. The widespread use of technical tools such as smartphones has been a great help in this regard. There are many actions, projects and research that have started up in Italy in this sense (Fig. 5).

Figure 4. Young bioblitzers and an old citizen scientist. Photo: Marco Bastianini (15.vi.2015)

Figure 5. Actions, projects, and research recently started up in Italy about the diffusion of scientific knowledge.

Citizen science is primarily a means of extended knowledge-gathering. It is important and timely to consider the larger implications of citizen science: as a way of developing new knowledge practices, shifting the institutional boundaries around science, and raising new questions and gaining new perspectives.

Acknowledgments

In the last five years I have been able to participate in dozens of bioblitzes as an entomologist, but without the commitment, dedication and expertise of dozens of organizers, such research would not have taken place or would have been much more thinned out over time. Many thanks in particular to Dr. Fabio Coccia Collepardo (Comitato Nazionale Bioblitz Italia), Dr. Andrea Sforzi (Museo di Storia Naturale della Maremma, Grosseto), and Lieutenant Colonel Bruno Petriccione (Comando Unità Tutela Forestale, Ambientale e Agroalimentare dell'Arma dei Carabinieri).

References

Hecker S., Bonney R., Haklay M., Hölker F., Hofer H., Goebel C., Gold M., Makuch Z., Ponti M., Richter A., Robinson L., Iglesias J.R., Owen R., Peltola T., Sforzi, A. Shirk J., Vogel J., Vohland K., Witt T. & Bonn A. 2018. Innovation in citizen science – Perspectives on science-policy advances. *Citizen Science: Theory and Practice* 3: 1-14

Letardi A. (ed.) 2016. Atlante fotografico dei Neuropterida della fauna italiana. Edizioni ENEA, Roma

Letardi A. & Scalercio S. 2018. Nuovi dati su Neuropterida della Calabria (Megaloptera, Raphidioptera, Neuroptera). *Rivista del Museo civico di Scienze naturali "E. Caffi" di Bergamo* 31: 71-88

McKinley D.C., Miller-Rushing A.J., Ballard H.L., Bonney R., Brown H., Cook-Patton S.C., Evans D.M., French R.A., Parrish J.K., Phillips T.B., Ryan S.F., Shanley L.A., Shirk J.L., Stepenuck K.F., Weltzin J.F., Wiggins A., Boyle O.D., Briggs R.D., Chapin III S.F., Hewitt D.A., Preuss P.W. & Soukup M.A. 2017. Citizen science can improve conservation science, natural resource management, and environmental protection. *Biological Conservation* 208: 15-28

Nicoli Aldini R. 2007. Insetti e altri invertebrati. In: Lorenzoni C. & Cravedi P. (Eds), Momeliano e il Rio Gandore di Gazzola: un itinerario nella biodiversità: 56-76. Università Cattolica del Sacro Cuore e Comune di Gazzola, Officina Foto Grafica, Piacenza

Pantaleoni R.A., Cesaroni C. & Mattei M. 2011. Entomologia elementare. Breve guida illustrata alla conoscenza degli Insetti. 2ª ed. Casa Editrice S'Alvure, Oristano

Tredick C.A., Lewison R.L., Deutschman D.H., Hunt T.A., Gordon K.L. & von Hendy P. 2017. A rubric to evaluate citizen-science programs for long-term ecological monitoring. *BioScience* 67: 834-844

Young J.C., Waylen K.A., Sarkki S., Albon S., Bainbridge I., Balian E., Davidson J., Edwards D., Fairley R., Margerison C., McCracken D., Owen R., Quine C.P., Stewart-Roper C., Thompson D., Tinch R., van den Hove S., Watt A. 2014. Improving the science policy dialogue to meet the challenges of biodiversity conservation: having conversations rather than talking at one-another. *Biodiversity and Conservation* 23: 387-404