

SILVANA PIERSANTI

Via del Greppone 12, 06125 Perugia, Italy - Phone: +393494990380- E-mail: silvana.piersanti@unipg.it
Nationality: Italian – Date of birth: 03-12-1977 Researcher ID: F-9083-2014

Since Nov 2019 Associate Professor in Zoology

- EDUCATION

January 2015 Scientific habilitation in Zoology II fascia BIO/05 05/B1 - ASN
Italian Ministry of University and Research

15 Feb.2007 **PhD in Biology and Ecology**

- Field of Research: Entomology- Behavioural studies in field and in the laboratory, Ultrastructural Morphology, Electrophysiology.
- Thesis - “ **Adaptative strategies of the larval dragonfly *Libellula depressa* (Odonata, Libellulidae) in drying ponds**”.

Department of Cellular and Environmental Biology
University of Perugia Perugia, Italy

7 May 2003 **Postgraduate Master in Environmental Education**
University of Urbino Pesaro, Italy

19 Mar. 2002 **Masters degree in Natural Sciences**

- Graduated *Summa Cum Laude*
- Thesis: “**Predatory behaviour by the larva of *Libellula depressa* (Odonata: Libellulidae) on *Cloeon dipterum* (Ephemeroptera: Baetidae)**”.

University of Perugia Perugia, Italy

- OTHER EDUCATIONAL EXPERIENCES

Apr. 2006 Conference/Course in “**Ecología de los Humedales**”.
Universidad de Puerto Rico San Juan, Puerto Rico

Jun. 2004 Intensive course in “**Genetic and Evolution of Animal Behaviour**”
Italian Association of Genetics Cortona, Italy

Oct. 2000 Practical Training in the “**Ecology of the Trasimeno Lake**”
University of Perugia Perugia, Italy

RESEARCH ACTIVITY

Nov. 2016/Nov 2019 **Researcher RTDb(L.240/2010)**

- Project: “**Sensory biology: a key to investigate insect relationship with the environment**”.

Department of Chemistry, Biology and Biotechnology
University of Perugia Perugia, Italy

Sept. 2012/Apr. 2016 **Researcher RTDa(L.240/2010)**

- Project: “ **A new insight in chemical ecology of insects: role of chemical cues in “visual dependent insects**”.

Department of Cellular and Environmental Biology
University of Perugia Perugia, Italy

Oct. 2006/July 2012 **Post doctoral position, “Assegnista di Ricerca”**

- Project: “ **Insects strategies to survive in temporary waters**”.
- Research Supervisor: Prof. Elda Gaino

Department of Cellular and Environmental Biology

University of Perugia

Perugia, Italy

2003/2007

PhD student in Biology and Ecology

- Thesis - " **Adaptative strategies of the larval dragonfly *Libellula depressa* (Odonata, Libellulidae) in drying ponds**".

Department of Cellular and Environmental Biology
University of Perugia

Perugia, Italy

- RESEARCH TOPICS AND SCIENTIFIC COLLABORATIONS

The main field of research is **Insect sensory biology particularly referred to aquatic insects and insect plant interactions.**

Ultrastructural observations (SEM, TEM), **electrophysiological recordings** (SCR, EAG) and **behavioral experiments** (in the field: track recording, behavioral pattern recording; in the laboratory: wind tunnel, olfactometer, multiple choice chamber, "observer" and "XBug" programs) are performed, in order to investigate structure and physiology of the sensory organs together with their involvement in insect biology and ecology.

Behavioral and electrophysiological studies are carried out in collaboration with the **Entomology Section of the Department of Agricultural and Environmental Science (DSAA) of Perugia University.**

Electrophysiological recordings have been also performed in collaboration with the **Department of Biology of the NTNU, Trondheim (Norway).**

Behavioural investigations in field with Odonata Insects are performed in collaboration with Prof. Ola Fincke (**University of Oklahoma, U.S.A.**).

Neuroanatomical studies are performed in collaboration with Prof. Bill Hansson and Prof Jurgen Rybak (**Max Plank Institute for Chemical Ecology, Jena, GERMANY**), Prof. Bente Gunnveing Berg at the **Department of Psychology of the NTNU, Trondheim (Norway)** and Prof. Sylvia Anton at the **Agrocampus ouest of University of Angers (INRA, Angers, France)**. Molecular investigations on the antennal transcriptome have been performed in collaboration with Dr. Emmanuelle Jacquin-Joly (**INRA, Versaille, FRANCE**).

Additional fields of research are respiration and reproduction in mayflies and dragonflies, functional morphology and biomimetics, freshwater bioindicators and alien species, in collaboration with Prof. Manuel Tierno de Figueroa and Prof. Manuel Jesús López-Rodríguez, **Department of Zoology (University of Granada)**, Prof. Adolfo Cordero Rivera (**Laboratory of Evolutionary and Conservation Ecology University of Vigo**) and Prof. Stanislav Gorb, Director of **Functional Morphology and Biomechanics Laboratories (University of Kiel)**.

- RESEARCH ABROAD

A.A. 2021/2022	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Agrocampus ouest, INRA and University of Angers	Angers, France
A.A. 2020/2021	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Agrocampus ouest, INRA and University of Angers	Angers, France
A.A. 2018/2019	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Agrocampus ouest, INRA and University of Angers	Angers, France
A.A. 2017/2018	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Department of Biology, NTNU	Trondheim, Norway
A.A. 2016/2017	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Department of Biology, NTNU	Trondheim, Norway
A.A. 2015/2016	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Department of Biology, NTNU	Trondheim, Norway
A.A. 2014/2015	Training in the framework of the LLP/ERASMUS Staff Mobility Programme Department of Biology, NTNU	Trondheim, Norway
March-Jul 2009	M.A.E. Research Scholarship (Norwegian Research Council) Electrophysiological recordings (SCR) from hygro-thermoreceptors in dragonfly adults Department of Biology, NTNU	Trondheim, Norway
Jan- Jun. 2005	Socrates/Erasmus fellowship for PhD students Electrophysiological recordings (SCR) from hygro-thermoreceptors in dragonfly larvae at NTNU	

laboratory
Research Supervisors: Prof. Hanna Mustaparta and Prof. Tor Jorgen Almaas
Department of Biology, NTNU Trondheim, Norway

- COORDINATED PROJECTS

- 2018/2019 **"Plant-herbivore interactions: an integrated view of the attack strategy of Pentatomid insects and the plant defence responses"**
University of Perugia Perugia, Italy
- 2012/2015 **"A new insight in chemical ecology of insects: role of chemical cues in "visual dependent insects"**
MIUR-FIRB Futuro in Ricerca Project 2010 Rome, Italy
- March-Jul 2009 **"Test by single cell recordings the hygro-termo sensory function of Odonata antennal sensilla"**
Norwegian Research Council Oslo, Norway

- PARTECIPATED PROJECTS

- 2020/2027 **Life IMAGINE**
EU Life Nature Project - University of Perugia Perugia, Italy
- 2014/2016 **"Ecology and biology of an alien invasive species: *Procambarus clarkii*".**
University of Perugia Perugia, Italy
- 2010/2013 **"Antennal ESTs from basal lineages of insects with derived life styles: understanding the evolution of an atypical insect-specific class of receptors - the olfactory receptors"**
Call for DNA sequencing at Genoscope Institute Evry Cedex, France
- 2010/2011 **"*Aedes albopictus* in Perugia district: bio-ecological and sanitary insight"**
Fondazione Cassa di Risparmio Perugia, Italy
- 2006/2009 **FISR M.I.C.E.N.A. " Integrate model for evolution of natural and agricultural ecosystems in response to climatic changes in the Mediterraneo"**
MIUR- FISR Project Rome, Italy
- 2003/2005 **"Habitat restoration and conservation of the Ardeidae at Trasimeno Lake" (Macroinvertebrates monitoring)**
EU Life Nature Project

- PUBLICATIONS

1. REBORA M., PIERSANTI S., GAINO E. (2004). Visual and mechanical cues in prey detection by the larva of *Libellula depressa* (Odonata: Libellulidae). *Ethology, Ecology & Evolution* 16(2), 133-144.
2. GAINO E., PIERSANTI S., REBORA M. (2007). Ultrastructural organization of the larval spiracles in *Libellula depressa* L. (Anisoptera: Libellulidae). *Odonatologica* 36(4), 373-379.
3. PIERSANTI S., REBORA M., GAINO E. (2007). The influence of prey size and movement on predation by the larva of *Libellula depressa* (Odonata, Libellulidae). *Rivista di Idrobiologia* 43, 159-164.
4. PIERSANTI S., REBORA M., SALERNO G., GAINO E. (2007). Behaviour of the larval dragonfly *Libellula depressa* (Odonata Libellulidae) in drying pools. *Ethology Ecology & Evolution* 19, 127-136.
5. REBORA M., PIERSANTI S., ALMAAS T.J., GAINO E. (2007). Hygroreceptors in the larva of *Libellula depressa* (Odonata: Libellulidae). *Journal of Insect Physiology* 53, 550-558.
6. REBORA M., PIERSANTI S., SALERNO G., CONTI E., GAINO E. (2007). Water deprivation tolerance and humidity response in a larval dragonfly: a possible adaptation for survival in drying ponds. *Physiological Entomology* 32, 121-126.
7. GAINO E., PIERSANTI S., REBORA M. (2008). Egg envelope synthesis and chorion modification after oviposition in the dragonfly *Libellula depressa* (Odonata, Libellulidae). *Tissue and Cell* 40, 317-324.
8. REBORA M., PIERSANTI S., GAINO E. (2008). The antennal sensilla of the adult of *Libellula depressa* (Odonata: Libellulidae). *Arthropod Structure and Development* 37, 504-510.
9. GAINO E., PIERSANTI S., REBORA M. (2009). Cuticular and sensory structures on the copulatory apparatus of *Rhithrogena semicolorata* (Ephemeroptera, Heptageniidae). *Aquatic insects* 31supp.1, 507-513.

10. GAINO E., LUDOVISI A., REBORA M., **PIERSANTI S.**, SCOCCIA F., FIORE P. (2009). Le spicole spongine in archivi sedimentari come proxy di cambiamenti climatico-ambientali nel Lago Trasimeno (Umbria). La Ricerca Italiana sui Cambiamenti Climatici- Un secondo incontro tra i progetti. Pubblicazione n°12 FISR M.I.C.E.N.A., 24-25.
11. GAINO E., **PIERSANTI S.**, REBORA M. (2009). The oviposition mechanism in *Habrophlebia eldae* (Ephemeroptera, Leptophlebiidae). Aquatic insects 31supp.1, 515-522.
12. REBORA M., **PIERSANTI S.**, GAINO E. (2009). The antennal sensilla of adult mayflies: *Rhithrogena semicolorata* as a case study. Micron 40, 571-576.
13. REBORA M., **PIERSANTI S.**, GAINO E. (2009). A comparative investigation on the antennal sensilla in adult Anisoptera. Odonatologica, 38(4), 329-340.
14. **PIERSANTI S.**, REBORA M., GAINO E. (2010). A scanning electron microscope study of the antennal sensilla in adult Zygoptera. Odonatologica, 39(3), 235-241.
15. REBORA M., MURÁNYI D., **PIERSANTI S.**, GAINO E. (2010). The lateral protrusions of the head of the stonefly larva *Leuctra cf. signifera* (Plecoptera; Leuctridae). Aquatic insects 32(4), 259-264.
16. **PIERSANTI S.**, REBORA M., ALMAAS T.J., SALERNO G., GAINO E. (2011). Electrophysiological identification of thermo- and hygro-sensitive receptor neurons on the antennae of the dragonfly *Libellula depressa*. Journal of Insect Physiology 57, 1391-1398.
17. REBORA M., SALERNO G., **PIERSANTI S.**, DELL'OTTO A., GAINO E. (2012). Olfaction in Dragonflies: electrophysiological evidence. Journal of Insect Physiology 58, 270-277.
18. GAINO E., SCOCCIA F., **PIERSANTI S.**, REBORA M., BELLUCCI L.G., LUDOVISI A. (2012). Spicule records of *Ephydatia fluviatilis* as a proxy for hydrological and environmental changes in the shallow Lake Trasimeno (Umbria, Italy). Hydrobiologia 679, 139-153.
19. REBORA M., DELL'OTTO A., RYBAK J., **PIERSANTI S.**, GAINO E., Hansson B. (2013). The antennal lobe of *Libellula depressa* (Odonata, Libellulidae). Zoology 116, 205-214.
20. LA PORTA G., DELL'OTTO A., SPEZIALE A., GORETTI E., REBORA M., **PIERSANTI S.**, GAINO E. (2013) Odonata biodiversity in some protected areas of Umbria, central Italy. Odonatologica 42(2), 125-137.
21. REBORA M., **PIERSANTI S.**, DELL'OTTO A., GAINO E. (2013). The gustatory sensilla on the endophytic ovipositor of Odonata. Arthropod Structure & Development, 42(2): 127-134.
22. REBORA M., **PIERSANTI S.**, GAINO E. (2013). The mechanoreceptors on the endophytic ovipositor of the dragonfly *Aeshna cyanea* (Odonata, Aeshnidae). Arthropod Structure & Development, 42: 369-378.
23. **PIERSANTI S.**, FRATI F., CONTI E., GAINO E., REBORA M., SALERNO G. (2014). First evidence of the use of olfaction in Odonata behaviour. Journal of Insect Physiology, 62: 26-31.
24. **PIERSANTI S.**, FRATI F., CONTI E., REBORA M., SALERNO G. (2014). The sense of smell in Odonata: an electrophysiological screening. Journal of Insect Physiology, 70: 49-58.
25. REBORA M., **PIERSANTI S.**, GAINO E. (2014). The epipharyngeal sensilla of the damselfly *Ischnura elegans* (Odonata, Coenagrionidae) Micron, 66:31-36.
26. **PIERSANTI S.**, REBORA M., SALERNO G., CORDERO- RIVERA A., FRATI F. (2015). A method for rearing a large number of damselflies (*Ischnura elegans*, Coenagrionidae) in the laboratory. International Journal of Odonatology, 18(2): 1-12.
27. REBORA M.1, **PIERSANTI S.1**, SALERNO G., GORB S. (authors reported as 1 equally contributed to the paper) (2015). The antenna of a burrowing dragonfly larva, *Onychogomphus forcipatus* (Anisoptera, Gomphidae). Arthropod Structure and Development, Arthropod Structure and Development, 44: 595 -603.
28. FRATI F.1, **PIERSANTI S.1**, REBORA M., SALERNO G. (authors reported as 1 equally contributed to the paper) (2015). Scent of a Dragonfly: sex recognition in a polymorphic Coenagrionid. PLoS ONE 10(8): e0136697. doi:10.1371/journal.pone.0136697.
29. **PIERSANTI S.1**, FRATI F.1, REBORA M., SALERNO G. (authors reported as 1 equally contributed to the paper) (2016). Carbon dioxide detection in adult Odonata, Zoology 119(2):137-42.
30. FRATI F.1, **PIERSANTI S.1**, REBORA M., SALERNO G. (authors reported as 1 equally contributed to the paper) (2016). Volatile cues can drive oviposition behaviour in Odonata. Journal of Insect Physiology 91-92: 34-38.
31. REBORA M., TIerno DE FIGUEROA J.M., **PIERSANTI S.** (2016). Antennal sensilla of the stonefly *Dinocras cephalotes* (Plecoptera: Perlidae). Arthropod Structure & Development 45: 552-561.
32. REBORA M., **PIERSANTI S.**, FRATI F., SALERNO G. (2017). Antennal responses to volatile organic compounds in a stonefly. Journal of Insect Physiology 98: 231-2376.
33. **PIERSANTI S.**, REBORA M., LOPEZ RODRIGUEZ M.J., TIerno DE FIGUEROA J.M., (2017). A comparison between the adult antennal sensilla of the cavernicolous stonefly *Protonemoura gevi* and other epigeal *Protonemoura* species (Plecoptera: Nemouridae) in a biological context. Annales de la Societè entomologique de France, 53: 47-54.
34. REBORA M., FRATI F., **PIERSANTI S.**, SALERNO G, SELVAGGINI R., FINCKE O.M., (2018). Field tests of multiple sensory cues in sex recognition and harassment of a colour polymorphic damselfly. Animal Behaviour 136:127-136.
35. **PIERSANTI S.**, REBORA M., (2018). The antennae of damselfly larvae. Arthropod Structure & Development, 47(1): 36-44.
36. **PIERSANTI S.**, PALLOTTINI M., SALERNO G., GORETTI E., ELIA A.C., REBORA M. (2018). Resistance to dehydration and positive hygrotaxis in the invasive red swamp crayfish *Procambarus clarkii*. knowledge and management of aquatic ecosystems, 419, 36.
37. SALERNO G., REBORA M., **PIERSANTI S.**, MICHELS J., GORB S. (2019) Structure and biomechanics of the antennal grooming

- mechanism in the southern green stink bug *Nezara viridula*. *Journal of Insect Physiology* 112:57-67.
38. EDERLI L., SALERNO G., BLANCHET C., REBORA M., PIERSANTI S., PASQUALINI S.(2019). *Eurydema oleracea* negatively affects defenses in Arabidopsis by inducing salicylic acid-mediated signaling pathway. *Arthropod-Plant Interactions* <https://doi.org/10.1007/s11829-019-09728-6>.
 39. COSTARELLI A, BIANCHET C., EDERLI L., SALERNO G., PIERSANTI S., REBORA M., PASQUALINI S (2019) Salicylic acid induced by herbivore feeding antagonizes jasmonic acid mediated plant defenses against insect attack. *Plant Signaling & Behavior*, DOI: 10.1080/15592324.2019.1704517.
 40. PIERSANTI S., REBORA M., EDERLI L., PASQUALINI S., SALERNO G.(2020). Role of chemical cues in cabbage stink bug host plant selection. *Journal of Insect Physiology* 120, 103994.
 41. REBORA M., SALERNO G., PIERSANTI S., GORB E., GORB S.(2020) Role of Fruit Epicuticular Waxes in Preventing *Bactrocera oleae* (Diptera: Tephritidae) Attachment in Different Cultivars of *Olea europaea*.
 42. REBORA M., SALERNO G., PIERSANTI S., GORB E., GORB S. (2020). Entrapment of *Bradysia paupera* (Diptera: Sciaridae) by *Phaseolus vulgaris* (Fabaceae) plant leaf. *Arthropod-Plant Interactions* <https://doi.org/10.1007/s11829-020-09760-x>.
 43. PIERSANTI S., REBORA M., SALERNO G., ANTON S., (2020). The Antennal Pathway of Dragonfly Nymphs, from Sensilla to the Brain. *Insects*, 11, 886; doi:10.3390/insects11120886.
 44. SALERNO G., REBORA M., PIERSANTI S., MATSUMURA Y, GORB E., GORB S. (2020). Variation of attachment ability of *Nezara viridula* (Hemiptera: Pentatomidae) during nymphal development and adult aging. *Journal of Insect Physiology* 127, 104117.
 45. PIERSANTI S., SALERNO G., DI PIETRO V., GIONTELLA L., REBORA M.; JONES A., FINCKE OM (2021). Tests of search image and learning in the wild: Insights from sexual conflict in damselflies. *Ecology and Evolution*;00:1–14.
 46. REBORA M., SALERNO G., PIERSANTI S., GORB E., GORB S. (2021) Attachment devices and the tarsal gland of the bug *Coreus marginatus*. (Hemiptera: Coreidae). *Zoomorphology* <https://doi.org/10.1007/s00435-020-00515-z>.
 47. REBORA M., SALERNO G., PIERSANTI S., KOVALEV A., GORB S. (2021). Cuticular modified air sacs underlie white coloration in the olive fruit fly, *Bactrocera oleae*. *Communications Biology* 4:881 | <https://doi.org/10.1038/s42003-021-02396-4>.
 48. SALERNO G., REBORA M., PIERSANTI S., BUSCHER T.H., GORB E., GORB S.(2021) Oviposition site selection and attachment ability of *Propylea quatuordecimpunctata* and *Harmonia axyridis* from the egg to the adult stage. *Physiological Entomology*, DOI: 10.1111/phen.12368.
 49. SALERNO G., REBORA M., PIERSANTI S., SAITTA V., KOVALEV A., GORB E., GORB S.(Reduction in Insect Attachment Caused by Different Nanomaterials Used as Particle Films (Kaolin, Zeolite, Calcium Carbonate) (2021). *Sustainability*, 13, 8250. <https://doi.org/10.3390/su13158250>.
- BOOK CHAPTERS**
50. REBORA M., PIERSANTI S., GAINO E. (2010). The antennal sensory function in the oldest pterygote insects: an ultrastructural overview. In: *Microscopy: Science, Tecnology, Applications and Education*, A. Mendez Vilas and J. Diaz Eds., FORMATEX, 137-145.
 51. REBORA M., SALERNO G., PIERSANTI S. (2019), Aquatic insect sensilla morphology and function. In *Aquatic Insects Behavior and Ecology*, K. Del Claro and R. Guillermo, Springer 139-167.
 52. REBORA M., SALERNO G., PIERSANTI S. (in press), Odonata perception is more than vision. In *Dragonflies and Damselflies model organisms for ecological and evolutionary research*.

TEACHING ACTIVITY

Since A.A. 2019/2020	Teacher for Animal models in the course of "Laboratory of Biotechnology"- Bachelor's Degree in Biotechnology University of Perugia,	Perugia, Italy
Since A.A. 2018/2019	Teacher for the zoology part in the course of " didactic of biology"- Master's Degree in Natural Science University of Perugia,	Perugia, Italy
Since A.A. 2018/2019	Teacher for the zoology part in the course of " didactic of biology"- Master's Degree in Biology University of Perugia,	Perugia, Italy
Since A.A. 2016/2017	Teacher for the zoology part in the course of "Biosistematic"- Master's Degree in Biology University of Perugia,	Perugia, Italy
Since A.A. 2013/2014	Teacher in the course of "Animal biodiversity"- Bachelor's Degree in Biology University of Perugia,	Perugia, Italy

A.A. 2013/2014	Training in the framework of the LLP/ERASMUS Staff Mobility Programme at Universidad de Granada- Departamento de Zoología, Facultad de Ciencias University of Granada,	Granada, Spain
A.A. 2012/2013	Teacher in the course of "Animal biodiversity and systematic"- Bachelor's Degree in Natural Sciences University of Perugia,	Perugia, Italy
Since A.A. 2007/2008	"Cultore della materia" in Ethology and Zoology courses, regular member of examining board for these courses. University of Perugia,	Perugia, Italy
Since A.A. 2002/2003	Teaching Assistant in Ethology and Zoology courses. Student assistant for exams and master thesis. Integrative seminars, laboratory exercitations, and field courses. University of Perugia,	Perugia, Italy
March 2006	Seminar "Sensilla in Odonata larvae: a behavioural and morphological approach" Neurobiology Institute, University of Puerto Rico	San Juan, Puerto Rico
January 2005	Course Assistant in Interactive Biophysics NTNU,	Trondheim, Norway