

University of Piemonte Orientale, Italy
Department of Sciences and Technological Innovation (DiSIT)

Curriculum vitae

Susanna Sforzini

<i>Name of employer</i>	University of Piemonte Orientale
<i>Name of person</i>	Dr. Susanna Sforzini
<i>Nationality</i>	Italian
<i>Position</i>	PhD
<i>Specialisation</i>	Ecology and Ecotoxicology
<i>Years with employer</i>	since 2006

Summary of qualifications, career and awards

2004	Doctor in Natural Science, University of Pavia, Italy.
2005-2006	University Master on the Ecological Risk Assessment, University of Piemonte Orientale, Italy.
2007-2011	PhD in Ecotoxicology, University of Piemonte Orientale, Italy.
2011-	Post PhD Fellowships, University of Piemonte Orientale, Italy.
2012-	Professor of Applied Ecology, University of Piemonte Orientale, Italy.
2007-	United Nations expert for the organisation of Mediterranean labs in the MED POL program. Teaching professor in the MED POL training courses on the biomarker utilisation.

Scientific Expertise

My interest is to develop new biomarkers to evaluate the alterations in the physiological status of edaphic organisms such as earthworms and protozoa, as well aquatic organisms. New cyto-immunohistochemical approaches were developed to follow the distribution of chemicals in cells and tissues and to clarify their toxic and genotoxic effects. In particular, diagnostic and prognostic biomarkers were developed to reveal the effects of chemicals from organism to population level. System biology tools were also used to study the mechanisms of action of inorganic and organic chemicals in the model organisms. An expert system for biomarker integration was also realized with the aim to follow the development of the stress syndrome in earthworms exposed to pollutants.

Publications

Sforzini S, Moore M, Mou Z, Boeri M, Banni M, Viarengo A. Mode of action of Cr(VI) in immunocytes of earthworms: implications for animal health. *Ecotoxicology and Environmental Safety*, in press.

Sforzini S, Oliveri L, Chinaglia S, Viarengo A., 2016. Application of biotests for the determination of soil ecotoxicity after exposure to biodegradable plastics. *Front. Environ. Sci.* 4:68. doi: 10.3389/fenvs.2016.00068.

Boughattas I, Hattab S, Boussetta H, Sappin-Didier V, Viarengo A, Banni M, Sforzini S., 2016. Biomarker responses of *Eisenia andrei* to a polymetallic gradient near a lead mining site in North Tunisia. *Environ Pollut.* 218, 530-541.

Sforzini S, Governa D, Boeri M, Oliveri L, Oldani A, Vago F, Viarengo A, Borrelli R., 2016. Relevance of the bioavailable fraction of DDT and its metabolites in freshwater sediment toxicity: New insight into the mode of action of these chemicals on *Dictyostelium discoideum*. *Ecotoxicol Environ Saf.* 132, 240-249.

Digilio G, Sforzini S, Cassino C, Robotti E, Oliveri C, Marengo E, Musso D, Osella D, Viarengo A, 2016. Haemolymph from *Mytilus galloprovincialis*: Response to copper and temperature challenges studied by 1H-NMR metabonomics. *Comp. Biochem. Physiol. C* 183-184, 61-71.

- Banni M, Sforzini S, Balbi T, Corsi I, Viarengo A, Canesi L, 2016. Combined effects of n-TiO₂ and 2,3,7,8-TCDD in *Mytilus galloprovincialis* digestive gland: A transcriptomic and immunohistochemical study. *Environ Res.* 145, 135-144.
- Hattab S, Boughattas I, Boussetta H, Viarengo A, Banni M, Sforzini S, 2015. Transcriptional expression levels and biochemical markers of oxidative stress in the earthworm *Eisenia andrei* after exposure to 2,4-dichlorophenoxyacetic acid (2,4-D). *Ecotoxicol Environ Saf* 122, 76-82.
- Baderna D, Lomazzi E, Passoni A, Pogliaghi A, Petoumenou MI, Bagnati R, Lodi M, Viarengo A, Sforzini S, Benfenati E, Fanelli R, 2015. Chemical characterization and ecotoxicity of three soil foaming agents used in mechanized tunneling. *J Hazard Mater.* 296, 210-220.
- Sforzini, S., Moore, M.N., Boeri, M., Bencivenga, M., Viarengo, A., 2015. Effects of PAHs and dioxins on the earthworm *Eisenia andrei*: A multivariate approach for biomarker interpretation. *Environ. Pollut.* 196: 60-71.
- Oliveri, C., Peric, L., Sforzini, S., Banni, M., Viarengo, A., Cavaletto, M., Marsano, F., 2014. Biochemical and proteomic characterisation of haemolymph serum reveals the origin of the alkali-labile phosphate (ALP) in mussel (*Mytilus galloprovincialis*). *Comp. Biochem. Physiol. Part D Genomics Proteomics* 11C, 29-36.
- Sforzini, S., Moore, M.N., Boeri, M., Benfenati, E., Colombo, A., Viarengo, A., 2014. Immunofluorescence detection and localization of B[a]P and TCDD in earthworm tissues. *Chemosphere* 107, 282-289.
- Carvalho, R.N., Arukwe, A., Ait-Aissa, S., Bado-Nilles, A., Balzamo, S., Baun, A., Belkin, S., Blaha, L., Brion, F., Conti, D., Creusot, N., Essig, Y., Ferrero, V.E., Flander-Putrlle, V., Fürhacker, M., Grillari-Voglauer, R., Hogstrand, C., Jonáš, A., Kharlyngdoh, J.B., Loos, R., Lundebye, A.K., Modig, C., Olsson, P.E., Pillai, S., Polak, N., Potalivo, M., Sanchez, W., Schifferli, A., Schirmer, K., Sforzini, S., Stürzenbaum, S.R., Søfteland, L., Turk, V., Viarengo, A., Werner, I., Yagur-Kroll, S., Zounková, R., Lettieri T., 2014. Mixtures of Chemical Pollutants at European Legislation Safety Concentrations: How Safe are They? *Toxicol Sci.*, doi: 10.1093/toxsci/kfu118.
- Banni, M., Attig, H., Sforzini, S., Oliveri, C., Mignone, F., Boussetta H., Viarengo, A., 2014. Transcriptomic responses to heat stress and nickel in the mussel *Mytilus galloprovincialis*. *Aquat Toxicol.* 148, 104-112.
- Attig, H., Kamel, N., Sforzini, S., Dagnino, A., Jamel, J., Boussetta, H., Viarengo, A., Banni, M., 2014. Effects of thermal stress and nickel exposure on biomarkers responses in *Mytilus galloprovincialis* (Lam). *Mar. Environ. Res.* 94, 65-71.
- Banni, M., Attig, H., Sforzini, S., Oliveri, C., Boussetta, H., Viarengo, A., 2014. Transcriptional expression levels and biochemical markers of oxidative stress in *Mytilus galloprovincialis* exposed to nickel and heat stress. *Comp. Biochem. Physiol. Part C.* 160, 23-29.
- Negri, A., Oliveri, C., Sforzini, S., Mignone, F., Viarengo, A., Banni, M., 2013. Transcriptional response of the mussel *Mytilus galloprovincialis* (Lam.) following exposure to heat stress and copper. *PLoS One.* 8(6):e66802.
- Sforzini, S., Boeri, M., Dagnino, A., Oliveri, L., Bolognesi, C., Viarengo, A., 2012. Genotoxicity assessment in *Eisenia andrei* coelomocytes: A study of the induction of DNA damage and micronuclei in earthworms exposed to B[a]P and TCDD-spiked soils. *Mutat. Res.* 746, 35-41.
- Moore, M.N., Viarengo, A., Somerfield, P.J., Sforzini, S., 2012. Linking lysosomal biomarkers and ecotoxicological effects at higher biological levels. In *Ecological Biomarkers: Indicators of Ecotoxicological Effects* (Editors: C. Amiard-Triquet, J.C. Amiard, P.S. Rainbow). Pp. 107-130.
- Gomiero, A., Sforzini, S., Dagnino, A., Nasci, C., Viarengo, A., 2012. The use of multiple endpoints to assess cellular responses to environmental contaminants in the interstitial marine ciliate *Euplotes crassus*. *Aquat. Toxicol.* 114,115, 206-216.
- Sforzini, S., Dagnino, A., Oliveri, L., Canesi, L., Viarengo, A., 2011. Effects of dioxin exposure in *Eisenia andrei*: integration of biomarker data by an Expert System to rank the development of pollutant-induced stress syndrome in earthworms. *Chemosphere* 85, 934-942.

Sforzini, S., Dagnino, A., Torrielli, S., Dondero, F., Fenoglio, S., Negri, A., Boatti, L., Viarengo, A., 2008. Use of highly sensitive sublethal stress responses in the social amoeba *Dictyostelium discoideum* for an assessment of freshwater quality. *Sci. Tot. Environ.* 395, 101-108.

Dagnino, A., Sforzini, S., Dondero, F., Fenoglio, S., Bona, E., Jensen, J., Viarengo, A., 2008. A "weight of evidence" approach for the integration of environmental "TRIAD" data assessing ecological risk and biological vulnerability. *Int. Env. Ass. Manag.* 4, 314-326.

Contributo per Notiziario dei Metodi Analitici, IRSA-CNR, Vol. 1 2015: Utilizzo di campionatori passivi in polietilene per la valutazione di inquinanti organici persistenti nei sedimenti e nelle acque di fiumi e laghi. A cura di Giulia Poma, Claudio Roscioli, Licia Guzzella, Istituto di Ricerca sulle Acque - CNR, Brugherio, MB; Borrelli Raffaella, Cesti Pietro, Fabio Vago, Alessandro Oldani, Istituto Eni Donegani, Novara, NO; Viarengo Aldo, Sforzini Susanna, Università del Piemonte Orientale "A. Avogadro", Alessandria, AL; Zaninetta Luciano Massimo, Syndial, Milano; Gschwend Phil, Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, MA, U.S.A.

ISPRA, 2012. Diossine, furani e policlorobifenili. Indagine ambientale nella Regione Campania. ISPRA, Quaderni e Laboratorio, p. 496 n. 1/2012. Valutazioni ecotossicologiche: analisi del rischio ambientale. Coordinamento: A. Dagnino, A. Viarengo, Università del Piemonte Orientale "Amedeo Avogadro". L. Avidano, E. Bona, A. Copetta, E. Gamalero, N. Massa, V. Todeschini, T. Bo, S. Fenoglio, L. Boatti, F. Capri, A. Dagnino, F. Dondero, A. Negri, C. Oliveri, L. Oliveri, I. Saggese, S. Sforzini, D. Vigani, G. Berta, G. Malacarne, A. Viarengo. Pp. 337-371.

Report of the ICES\OSPAR Workshop on Lysosomal Stability Data Quality and Interpretation (WKLYS). ICES/OSPAR WKLYS REPORT 2010, 13-17 September 2010, Alessandria, Italy.

SUPPLEMENT

Sforzini, S., Boeri, M., Olivieri, S., Viarengo, A., 2012. Effects of environmentally relevant concentrations of Cr(VI) on earthworms: role of oxidative stress in physiological alterations. *Comp. Biochem. Physiol. A* 163, Supplement, S25.

Boatti, L., Perić, L., Olivieri, S., Sforzini, S., Viarengo, A., 2012. Effects of Cu and thermal stress on mussel's haemolymph proteins oxidation. *Comp. Biochem. Physiol. A* 163, Supplement, S8-S9.

Gomiero, A., Dagnino, A., Sforzini, S., Negri, A., Viarengo, A., 2012. Heat stress effects on toxicity of copper and oxytetracycline on the marine protozoa *Euplotes crassus* in a climate change perspective. *Comp. Biochem. Physiol. A* 163, Supplement, S4.

Governa, D., Boeri, M., Congiu, A., Oldani, A., Vago, F., Cucchetti, D., Borrelli, R., Cesti, P., Viarengo, A., Sforzini, S., 2012. Use of *Dictyostelium discoideum* as model organism for the evaluation of biological effects due to DDT and mercury in field and laboratory studies. *Comp. Biochem. Physiol. A* 163, Supplement, S14.

Sforzini, S., Dagnino, A., Saggese, I., Oliveri, L., Negri, A., Canesi, L., Viarengo, A., 2010. Use of the earthworm *Eisenia andrei* as model organism for soil toxicity assessments. *Comp. Biochem. Physiol. A* 157, Supplement, S34.

Sforzini, S., Saggese, I., Oliveri, L., Viarengo, A., Bolognesi, C., 2010. Use of the Comet and micronucleus assays for in vivo genotoxicity assessment in the coelomocytes of the earthworm *Eisenia andrei*. *Comp. Biochem. Physiol. A* 157, Supplement, S13.

Dagnino, A., Sforzini, S., Boatti, L., Caprì, F., Oliveri, C., Negri, A., Dondero, F., Viarengo, A., 2010. Sub-lethal effects of copper combined with temperature stress in the marine mussel *Mytilus galloprovincialis*. *Comp. Biochem. Physiol. A* 157, Supplement, S38-S39.

Dagnino, A., Fenoglio, S., Avidano, L., Sforzini, S., Viarengo, A., Forte, T., Ottavi, C., Peleggi, M., 2010. Coupling chemical data and pollutant-induced biological effects increases reliability in environmental risk assessment: From sublethal biomarkers to community studies. *Comp. Biochem. Physiol. A* 157, Supplement, S56.

Negri, A., Dondero, F., Dagnino, A., Boatti, L., Sforzini, S., Caprì, F., Oliveri, C., Viarengo, A., Chessa, L.A., 2010. Application of a biomarker-transcriptomics approach utilizing mussels in the evaluation of the water quality in a marine coastal area of Medio Campidano (Sardinia, Italy). *Comp. Biochem. Physiol. A* 157, Supplement, S25-S25.

Sforzini, S., Dagnino, A., Saggese, I., Negri, A., Bolognesi, C., Viarengo, A., 2009. Use of an Expert System for biomarkers' data integration to assess the level of stress syndrome in *Eisenia andrei* exposed to dioxin-spiked soils. *Comp. Biochem. Physiol. A* 154, Supplement, S24.