

Curriculum Vitae

NAME Alain Puppo
ADDRESS 128 Avenue des Arènes, 06000 Nice, France
DATE & PLACE OF BIRTH 29 september 1950, 06500 Menton, France

EDUCATION

1972 Master in Biochemistry, University of Nice
1975 PhD in Plant Biology, University of Nice – Sophia Antipolis
1981 Doctorat d’Etat in Plant Biology, University of Nice – Sophia Antipolis

POSTDOCTORAL TRAINING

1987-1988 King’s College London, Professor Barry Halliwell laboratory

ACADEMIC APPOINTMENTS

1976 Lecturer, University of Nice
1983 Senior-Lecturer, University of Nice – Sophia Antipolis
1989 Reader, University of Nice – Sophia Antipolis
1995 Professor, University of Nice – Sophia Antipolis

MAJOR PROFESSIONAL SERVICE

National Council of the Universities	Member	1996-2003
National Committee of Scientific Research	Member	2004-2007
National Agency of Research	Reviewer	2007-present
Plant Oxygen Group (Society for Free Radical Research – Europe)	President	2001-2003

Australian Research Council	Reviewer	2001-2004
UK Royal Society	Reviewer	1998-2000
Scientific Council of the University of Nice – Sophia Antipolis	Member	2008-present

RESEARCH ACTIVITIES

- Twenty years experience conducting research on the role of reactive oxygen and antioxidants in plants and studying redox-related processes in the framework of the Legume – Rhizobium symbiosis
- h-index: 27
- Sum of the times cited: 2376
- Citations per year: 172 in 2007, 174 in 2008 and 184 in 2009
- Coordinator of two European Research Training Networks
- Scientist in charge of eight European Marie Curie Fellowships
- Leader of a group including five researchers and senior-lecturers, four engineers and technicians, three post-doctoral and three doctoral fellows
- Deputy-Director of the Unité Mixte de Recherche CNRS – INRA – Université de Nice – Sophia Antipolis “Interactions Biotiques et Santé Végétale”, which gathers more than 100 people.

TEACHING ACTIVITIES

- Plant Cell Biology and Plant Physiology and Biochemistry to undergraduate students
- Plant Biology (mainly Plant Development) to Master students
- Plant – Microbe Interactions to Master students

PUBLICATIONS

- (1) PUPPO, A., J. RIGAUD and Ph. BARTHE (1974). Sur la présence de cytokinines dans les nodules de *Phaseolus vulgaris* L. *C. R. Acad. Sc. Paris* , **279**, 2029-2032.
- (2) RIGAUD, J. and A. PUPPO (1975). Indole-3-acetic acid catabolism by soybean bacteroids. *J. Gen. Microbiol.*, **88**, 223-228.
- (3) PUPPO, A. and J. RIGAUD (1975). Indole-3-acetic acid (IAA) oxidation by leghemoglobin from soybean nodules. *Physiol. Plant.*, **35**, 181-185.

- (4) RIGAUD, J. and A. PUPPO (1977). Effect of nitrite upon leghemoglobin and interaction with nitrogen fixation. *Biochim. Biophys. Acta* , **497**, 702-706.
- (5) PUPPO, A. and J. RIGAUD (1978). Cytokinins and morphological aspects of French-bean roots in the presence of *Rhizobium*. . *Physiol. Plant.*, **42**, 202-206.
- (6) PUPPO, A. and J. RIGAUD (1979). A possible reduction pathway for leghemoglobin *in vivo* . *FEBS Lett.*, **108**, 124-126.
- (7) JOB, D., B. ZEBA, A. PUPPO and J. RIGAUD (1980). Kinetic studies of the reaction of ferric soybean leghemoglobins with hydrogen peroxide, cyanide and nicotinic acid. *Eur. J. Biochem.*, **107**, 491-500.
- (8) PUPPO, A., J. RIGAUD and D. JOB (1980). Leghemoglobin reduction by a nodule reductase. *Plant Sci. Lett.*, **20**, 1-6 .
- (9) PUPPO, A., J. RIGAUD, D. JOB, J. RICARD and B. ZEBA (1980). Peroxidase content of soybean root nodules. *Biochim. Biophys. Acta* , **614**, 303-312.
- (10) PUPPO, A., J. RIGAUD and D. JOB (1981) . Role of superoxide anion in leghemoglobin autoxidation . *Plant Sci. Lett.*, **22**, 353-360 .
- (11) PUPPO, A., L. DIMITRIJEVIC and J. RIGAUD (1982). Possible involvement of nodule superoxide dismutase and catalase in leghemoglobin protection. *Planta*, **156**, 374-379.
- (12) DIMITRIJEVIC, L., A. PUPPO and J. RIGAUD (1984). Superoxide dismutase activities in *Rhizobium phaseoli* bacteria and bacteroids. *Arch. Microbiol.*, **139**, 174-178.
- (13) PUPPO, A., L. DIMITRIJEVIC, H.G. DIEM and Y.R. DOMMERGUES (1985). Homogeneity of superoxide dismutase patterns in *Frankia* strains from *Casuarinaceae* . *FEMS Microbiol. Lett.*, **30**, 43-46.
- (14) PUPPO, A., L. DIMITRIJEVIC, J.C. TRINCHANT and J. RIGAUD (1986) Acetylene reduction and superoxide dismutase activities in *Sesbania rostrata* root and stem nodules. *Physiol. Vég.*, **24**, 689-696.
- (15) PUPPO, A. and J. RIGAUD (1986). Superoxide dismutase : an essential role in the protection of the nitrogen fixation process? *FEBS Lett.*, **201**, 187-189.
- (16) PUPPO, A. (1986). Peroxidatic activities of legume root nodules. In *Molecular and Physiological Aspects of Plant Peroxidases*, H. Greppin, C. Penel et Th. Gaspar, eds, Genève, pp. 395-404.
- (17) PUPPO, A., L. DIMITRIJEVIC and J. RIGAUD (1987). O₂ consumption and superoxide dismutase content in purified mitochondria from soybean root nodules. *Plant Sci.*, **50**,3-11.
- (18) PUPPO, A. and J. RIGAUD (1987). Separation of soybean leghemoglobin components by isoelectric focusing in immobilized pH gradients. *Electrophoresis*, **8**, 212-214.

- (19) PUPPO, A. and B. HALLIWELL (1988). Formation of hydroxyl radicals from hydrogen peroxide in the presence of iron. Is haemoglobin a biological Fenton reagent? *Biochem. J.*, **249**, 185-190.
- (20) PUPPO, A. and B. HALLIWELL (1988). Generation of hydroxyl radicals by soybean nodule leghaemoglobin. *Planta* , **173**, 405-410.
- (21) PUPPO, A. and B. HALLIWELL (1988). Formation of hydroxyl radicals in biological systems . Does myoglobin stimulate hydroxyl radical formation from hydrogen peroxide ? *Free Rad. Res. Comm.*, **4**, 415-422.
- (22) KAUR, H., I. FAGERHEIM, M. GROOTVELD, A. PUPPO and B. HALLIWELL (1988). Aromatic hydroxylation of phenylalanine as an assay for hydroxyl radicals : Application to activated human neutrophils and to the heme protein leghemoglobin. *Anal. Biochem.*, **172**, 360-367.
- (23) PUPPO, A. and B. HALLIWELL (1989). Oxidation of dimethylsulfoxide to formaldehyde by oxyhaemoglobin and oxyleghemoglobin in the presence of hydrogen peroxide is not mediated by "free" hydroxyl radicals. *Free Rad. Res. Comm.*, **5**, 277-281.
- (24) DIMITRIJEVIC, L., A. PUPPO, J.C. TRINCHANT and J. RIGAUD (1989). Ferrochelatase activities and heme contents in purified mitochondria from soybean roots and root nodules. *J. Plant. Physiol.*, **134**, 642-644.
- (25) PUPPO, A., L. DIMITRIJEVIC and J. RIGAUD (1989) Superoxide dismutase and catalase activities in purified *Frankia* vesicles. *Physiol. Plant.*, **77**, 308-311.
- (26) HERRADA, G., A. PUPPO and J. RIGAUD (1989) Uptake of metabolites by bacteroid-containing vesicles and by free bacteroids from French bean nodules. *J. Gen. Microbiol.*, **135**, 3165-3171.
- (27) PUPPO, A. and B. HALLIWELL (1989). On the reaction of plant ferredoxins with hydrogen peroxide. What reactive radicals are generated ? *Phytochemistry* , **28**, 3265-3270.
- (28) RIGAUD, J., J.C. TRINCHANT, A. PUPPO and L. DIMITRIJEVIC (1989). Oxygen protection and oxygen requirement for C₂H₂ reduction by *Sesbania* nodules and bacteroids. ORSTOM Proceedings, Dakar 1989, 57-61.
- (29) PUPPO, A., R. CECCHINI , O.I. ARUOMA, R. BOLLI and B. HALLIWELL (1990). Scavenging of hypochlorous acid and of myoglobin-derived oxidants by the cardioprotective agent mercaptopropionyl glycine. *Free Rad. Res. Comm.*, **10**, 371-382.
- (30) PUPPO, A., G. HERRADA and J. RIGAUD (1991). Lipid peroxidation in peribacteroid membranes from french-bean nodules. *Plant Physiol.*, **96**, 826-830.
- (31) DAVIES, M.J. and A. PUPPO (1992). Direct detection of a globin-derived radical in leghaemoglobin treated with peroxides. *Biochem. J.*, **281**, 197-201.

- (32) PUPPO, A. (1992). Effect of flavonoids on hydroxyl radical formation by Fenton-type reactions ; influence of the iron chelator. *Phytochemistry*, **31**, 85-88.
- (33) HERRADA, G., A. PUPPO and J. RIGAUD (1992). Δ -aminolevulinate uptake by *Rhizobium* bacteroids and its limitation by the peribacteroid membrane in legume nodules. *Biochem. Biophys. Res. Comm.*, **184**, 1324-1330.
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- (35) DAVIES, M.J. and A. PUPPO (1993). Identification of the site of the globin-derived radical in leghemoglobins. *Biochim. Biophys. Acta*, **1202**, 182-188.
- (36) PUPPO, A., C. MONNY and M.J. DAVIES (1993). Glutathione-dependent conversion of ferryl leghaemoglobin into the ferric form : a potential protective process in soybean (*Glycine max*) root nodules. *Biochem. J.*, **289**, 435-438.
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- (39) MOREAU, S., J.M. MEYER and A. PUPPO (1995). Uptake of iron by symbiosomes and bacteroids from soybean nodules. *FEBS Lett.*, **361**, 225-228.
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- (41) HEROUART D., S. SIGAUD, S. MOREAU, P. FREND, D. TOUATI and A. PUPPO (1996). Cloning and characterization of the *kata* gene of *Rhizobium meliloti* encoding a hydrogen peroxide-inducible catalase. *J. Bacteriol.*, **178**, 6802-6809.
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- (46) MOREAU, S., D.A. DAY and A. PUPPO (1998). Ferrous iron is transported across the peribacteroid membrane of soybean nodules. *Planta*, **207**, 83-87.
- (47) LUCAS M.M., G. VAN DE SYPE, D. HEROUART, M.J. HERNANDEZ, A. PUPPO and M.R. DE FELIPE (1998). Immunolocalization of ferritin in determinate and indeterminate legume root nodules. *Protoplasma*, **204**, 61-70.
- (48) FRENO, P., D. GALLES, R. TURNBULL, G. VAN DE SYPE, D. HEROUART and A. PUPPO (1999). Localisation of glutathione and homogluthione in *Medicago truncatula* is correlated to a differential expression of genes involved in their synthesis. *Plant J.*, **17**, 215-219.
- (49) DAVIES, M.J., C. MATHIEU and A. PUPPO (1999). Leghemoglobin : properties and reactions. *Adv. Inorg. Chem.*, **46**, 495-542.
- (50) SIGAUD, S., V. BECQUET, P. FRENO, A. PUPPO and D. HEROUART (1999). Differential regulation of two divergent HPII-like catalase genes of *Sinorhizobium meliloti* during free living growth and protective role of both catalases during symbiosis. *J. Bacteriol.*, **181**, 2634-2639.
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- (52) FRENO, P., C. MATHIEU, G. VAN DE SYPE, D. HEROUART and A. PUPPO (1999). Characterisation of a cDNA encoding γ -glutamylcysteine synthetase in *Medicago truncatula*. *Free Rad. Res.*, **31**, 213-218.
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- (55) SANTOS, R., D. HEROUART, S. SIGAUD, D. TOUATI and A. PUPPO (2001). Oxidative burst in alfalfa-*Sinorhizobium meliloti* symbiotic interaction. *Molec. Plant-Microbe Interact.*, **14**, 86-89.
- (56) FRENO, P., M.J. HERNANDEZ-JIMENEZ, C. MATHIEU, L. DURET, D. GALLES, G. VAN DE SYPE, D. HEROUART and A. PUPPO (2001) A *Medicago truncatula* homogluthione synthetase is derived from glutathione synthetase by gene duplication. *Plant Physiol.*, **126**, 1706-1715.

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- (61) JAMET, A., S. SIGAUD, G. VAN DE SYPE, A. PUPPO and D. HEROUART (2003) Expression of the bacterial catalase genes during *Sinorhizobium meliloti* - *Medicago sativa* symbiosis and their crucial role during the infection process. *Molec. Plant-Microbe Interact.*, **16**, 217-225.
- (62) ALESANDRINI, F., P. FRENDON, D. HEROUART and A. PUPPO (2003) Isolation of a molecular marker of soybean nodule senescence. *Plant Physiol. Biochem.*, **41**, 727-732.
- (63) KAISER, B.N., S. MOREAU, J. CASTELLI, R. THOMSON, A. LAMBERT, S. BOGLIOLO, A. PUPPO and D.A. DAY (2003) The soybean NRAMP homologue, GmDMT1, is a symbiotic divalent metal transporter capable of ferrous iron transport. *Plant J.*, **35**, 295-304.
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- (65) ARDISSONE, S., P. FRENDON, E. LAURENTI, W. JANTSCHKO, C. OBINGER and A. PUPPO (2004) Purification and physical-chemical characterization of the three hydroperoxidases from the symbiotic bacterium *Sinorhizobium meliloti*. *Biochemistry*, **43**, 12692-12699.
- (66) PUPPO, A., K. GROTEN, F. BASTIAN, R. CARZANIGA, M. SOUSSI, M. LUCAS, M. DE FELIFE, J. HARRISON, H. VANACKER and C. FOYER (2005) Legume nodule senescence : roles for redox and hormone signalling in the orchestration of the natural aging process. *New Phytol.*, **165**, 683-701.
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- (74) PAULY, N., C. PUCCIARIELLO, K. MANDON, G. INNOCENTI, A. JAMET, E. BAUDOUIN, D. HEROUART, P. FRENO and A. PUPPO (2006) Reactive oxygen and nitrogen species and glutathione : key players in the legume – *Rhizobium* symbiosis. *J. Exp. Bot.*, **57**, 1769-1776.
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- (76) MARINO, D., P. FRENO, R. LADRERA, A. ZABALZA, A. PUPPO and C. ARRESE-IGOR (2007) Nitrogen fixation control under drought stress : localised or systemic ? *Plant Physiol.*, **143**, 1968-1974.
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- (78) JAMET, A., K. MANDON, A. PUPPO and D. HEROUART (2007) H₂O₂ is required for an optimal establishment of the *Medicago/Sinorhizobium meliloti* symbiosis. *J. Bacteriol.*, **187**, 8741-8745.

- (79) FERRARINI, A., M. DE STEFANO, E. BAUDOUIN, A. POLVERARI, A. PUPPO[#] and M. DELLEDONNE[#] (2008) Modulation of *Medicago truncatula* NO-responsive gene expression in pathogenic and symbiotic conditions. *Molec. Plant-Microbe Interact.*, **21**, 781-790. ([#]corresponding authors).
- (80) CHANG, C., I. DAMIANI, A. PUPPO and P. FRENDI (2009) Redox changes during the Legume – Rhizobium symbiosis. *Mol. Plant*, **2**, 370-377.
- (81) PUCCIARIELLO, C., G. INNOCENTI, W. VAN DE VELDE, A. LAMBERT, M. PONCHET, N. PAULY, S. GOORMACHTIG, M. HOLSTERS, A. PUPPO[#] and P. FRENDI (2009) (Homo)glutathione depletion modulates host gene expression during the symbiotic interaction between *Medicago truncatula* and *Sinorhizobium meliloti*. *Plant Physiol.*, **151**, 1186-1196. ([#]corresponding author).