

Domenico Bosco

Curriculum vitae et studiorum

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### **Studi conseguiti e ruolo professionale**

1988 - Laurea in Scienze Agrarie – Università di Torino

1988 – 1991 Dottorando di ricerca in Entomologia Agraria – Sede Dottorato: Università di Bologna

1992 - 93 - Borsista CNR presso l'Istituto di Virologia Vegetale del CNR di Torino

1994 - Ricercatore universitario presso il Di.Va.P.R.A. – Entomologia e Zoologia

1996 - CNR Fellowship presso CPRO-DLO, Ministero dell'Agricoltura, Wageningen, Olanda

Dal 2006 - Ricercatore Associato all'Istituto di Protezione Sostenibile delle Piante, CNR, Torino

2007 - Fulbright Scholarship presso University of California Berkeley, Department of Environmental Science and Policy

2011 – Professore associato in Entomologia Agraria

2016 - Visiting Professor, UMR 1332 Biologie du Fruit et Pathologie, INRA et Université de Bordeaux

2019 – Professore ordinario in Entomologia Agraria

### **Attività e progetti di ricerca**

L'attività di ricerca è volta allo studio degli insetti vettori di agenti fitopatogeni.

I principali temi di indagine sono:

- Sputacchine vettrici di *Xylella fastidiosa*
- Cicadellidi vettori di fitoplasmii, con particolare riguardo all'epidemiologia della flavescenza dorata della vite
- Relazioni agente fitopatogeno-insetto con tecniche biologiche, molecolari e proteomiche
- Biologia, ecologia e fenologia di sputacchine in oliveto e vigneto
- Funghi entomopatogeni per il controllo di emittenti vettori
- Virus e salute dell'ape

Responsabile scientifico di progetti di ricerca dell'Unione Europea (Horizon2020, HorizonEurope ed EFSA), Ministero dell'Università, del Consiglio Nazionale delle Ricerche, della Regione Piemonte e di convenzioni di ricerca. È Associato di Ricerca presso il CNR-IPSP sede di Torino.

### **Collaboratori**

Nicola Bodino - Post-Doc (biologia della trasmissione di *Xylella fastidiosa*, biologia, ecologia e fenologia di sputacchine)

Sara Ottati - Post-Doc (viroma di insetti vettori)

Cecilia Parise – PhD (biotecnologie per il controllo di insetti vettori)

### **Attività didattica**

Docente di Entomologia e Biotecnologie entomologiche nel Corso di Laurea Magistrale in Biotecnologie Vegetali, di Entomologia viticola nel Corso di Laurea Magistrale in Scienze Viticole ed Enologiche e di Ricerca Bibliografica e Bibliometria nella Corso di Dottorato in Scienze agrarie, forestali ed alimentari. Coordinatore del corso di dottorato in Scienze Agrarie, Forestali e Alimentari dell'Università degli Studi di Torino. Responsabile Tirocinio Formativo nel Corso di Laurea Magistrale in Biotecnologie Vegetali dell'Università degli Studi di Torino.

### **Altre attività**

- Membro del Comitato Tecnico su *Xylella fastidiosa*, Mipaaf
- Membro del Comitato Tecnico su Flavescenza dorata, Regione Piemonte

- Membro di Working groups su *Xylella fastidiosa* e su Directive 2000/29 Phytoplasma della European Food Safety Authority (EFSA)
- EFSA external expert

English version

### **Education and professional position**

1988 – University Degree in Agriculture – University of Torino

1989 - 1991 - PhD Student in Agricultural Entomology

1992 - 93 - Research fellowship at the Istituto di Virologia Vegetale, Italian National Research Council, CNR, Torino

1994 up to now – Research Scientist at Di.Va.P.R.A. – Entomology and Zoology

1996 - CNR fellowship at CPRO-DLO, Ministry of Agriculture, Wageningen, The Netherlands

From 2006 onwards – Research Associate at the Institute for Sustainable Plant Protection, CNR, Torino

2007 - Fulbright Scholarship at the University of California Berkeley, Department of Environmental Science and Policy

2011 – Associate Professor of Agricultural Entomology

2016 - Visiting Professor, UMR 1332 Biologie du Fruit et Pathologie, INRA et Université de Bordeaux

2019 – Full Professor of Agricultural Entomology

### **Research interests and current research projects**

Research activity is focused on the study of insect vectors of plant pathogens.

Main research topics are:

- Spittlebugs vectors of *Xylella fastidiosa*
- Leafhoppers vectors of phytoplasmas, with emphasis on grapevine Flavescence dorée epidemiology
- Biology, ecology and phenology of spittlebugs in olive groves and vineyards
- Plant pathogen/vector relationships
- Entomopathogenic fungi for insect vector control
- Viruses and health of honey bees

Scientific responsible of research projects funded by European Union (Horizon2020, HorizonEurope and EFSA), Italian Ministry of Education and Research, Italian National Research Council, Piemonte Region, Bank foundations and private companies.

### **Collaborators**

Nicola Bodino - Post-Doc (*Xylella fastidiosa* transmission biology, biology, ecology and phenology of spittlebugs)

Sara Ottati – PostDoc (virome of vector insects)

Cecilia Parise – PhD (biotechnologies for vector insect control)

### **Teaching activity**

Entomology and Insect Biotechnologies (Master Degree in Plant Biotechnology)

Viticultural Entomology (Master Degree in Viticulture and Oenology)

Bibliographic search and bibliometry (PhD School in Agriculture, Forestry and Food Sciences).

Coordinator of the PhD course in Agricultural, Forestry and Food Sciences, University of Torino.

**PUBBLICAZIONI ISI**  
**PUBLICATIONS ON ISI JOURNALS**

**(SCOPUS bibliometric indexes: 111 documents, 2877 citations, h-index 33, as of October 2022)**

1. Bodino N., Cavalieri, V., Saponari, M., Dongiovanni, C., Altamura G., **Bosco, D.**, 2022. Transmission of *Xylella fastidiosa* subsp. *pauca* ST53 by the sharpshooter *Cicadella viridis* from different source plants and artificial diets. *Journal of Economic Entomology*, accepted.
2. Formisano, G., Iodice, L., Cascone, P., Sacco, A., Quarto, R., Cavalieri, V., **Bosco, D.**, Guerrieri, E. & Giorgini, M. 2022. Wolbachia infection and genetic diversity of Italian populations of *Philaenus spumarius*, the main vector of *Xylella fastidiosa* in Europe. *PloS one*, 17(8), e0272028.
3. Ripamonti, M., Maron, F., Cornara, D., Marzachi, C., Fereres, A., & **Bosco, D.** 2022. Leafhopper feeding behaviour on three grapevine cultivars with different susceptibilities to Flavescence dorée. *Journal of Insect Physiology*, 137, 104366. <https://doi.org/10.1016/j.jinsphys.2022.104366>
4. Ripamonti, M., Galetto, L., Maron, F., Marzachi, C., & **Bosco, D.** 2022. *Scaphoideus titanus* fitness on grapevine varieties with different susceptibility to Flavescence dorée phytoplasma. *Journal of Applied Entomology*. DOI: 10.1111/jen.13075
5. Galetto, L., Ripamonti, M., Abbà, S., Rossi, M., Manfredi, M., Bosco, D., & Marzachi, C. 2021. Silencing of ATP synthase  $\beta$  induces female sterility in a leafhopper phytoplasma vector. *Entomologia Generalis*, Vol. 41(5), 497-510. DOI: 10.1127/entomologia/2021/1267
6. Bodino N., Demichelis S., Simonetto A., Volani S., Saladini M.A., Gilioli G., **Bosco D.**, 2021. Phenology, seasonal abundance, and host-plant association of spittlebugs (Hemiptera: Aphrophoridae) in vineyards of Northwestern Italy. *Insects* 2021, 12, 1012. <https://doi.org/10.3390/insects12111012>
7. Bodino N., Cavalieri V., Pegoraro M., Altamura G., Canuto F., Zicca S., Fumarola G., Almeida R.P.P., Saponari M., Dongiovanni C., **Bosco D.**, 2021. Temporal dynamics of the transmission of *Xylella fastidiosa* subsp. *pauca* by *Philaenus spumarius* to olive plants. *Entomologia Generalis*, 41(5), 463-480. DOI: 10.1127/entomologia/2021/1294
8. Galetto L., Abbà S., Rossi M., Ripamonti M., Palmano S., **Bosco D.** Marzachi D., 2021. Silencing of ATP synthase reduces phytoplasma multiplication in a leafhopper vector. *Journal of Insect Physiology*, 128. DOI: 10.1016/j.jinsphys.2020.104176.
9. Bodino N., Cavalieri V., Dongiovanni C., Simonetto A., Saladini M.A., Plazio E., Gilioli G., Molinatto G., Saponari M. and **Bosco D.**, 2021. Dispersal of *Philaenus spumarius* (Hemiptera: Aphrophoridae), a vector of *Xylella fastidiosa*, in olive grove and meadow agroecosystems. *Environmental Entomology*, 50(2), 267-279. DOI: 10.1093/ee/nvaa140.
10. Ripamonti M., Pegoraro M., Morabito C., Gribaudo I., Schubert A., **Bosco D.**, Marzachi C., 2020. Susceptibility to Flavescence dorée of different *Vitis vinifera* genotypes from North-Western Italy. *Plant Pathology*, 70(3), 511-520. DOI: 10.1111/ppa.13301.
11. Ripamonti M., Pacifico D, Roggia C., Palmano S., Rossi M., Bodino N., Marzachi' C., **Bosco D.** and Galetto L. 2020. Recovery from grapevine Flavescence dorée in areas of high infection pressure. *Agronomy* 10, 1479; doi:10.3390/agronomy10101479

12. Molinatto, G., Demichelis, S., Bodino, N., Giorgini, M., Mori, N., & **Bosco, D.** 2020. Biology and Prevalence in Northern Italy of *Verrallia aucta* (Diptera, Pipunculidae), a Parasitoid of *Philaenus spumarius* (Hemiptera, Aphrophoridae), the Main Vector of *Xylella fastidiosa* in Europe. *Insects*, 11(9), 607, pp. 1-16. <https://doi.org/10.3390/insects11090607>
13. Ripamonti M., Pegoraro M., Rossi M., Bodino N., Beal D., Panero L., Marzachi C. and **Bosco D.**, 2020. Prevalence of Flavescence Dorée Phytoplasma-Infected *Scaphoideus titanus* in Different Vineyard Agroecosystems of Northwestern Italy. *Insects*, 11(5), 301.
14. Ottati S., Persico A., Rossi M., **Bosco D.**, Vallino M., Abbà S., Molinatto G., Palmano S., Balestrini R., Galetto L., Marzachi C., 2020. Biological characterization of *Euscelidius variegatus* inflavirus 1. *Journal of Invertebrate Pathology*, <https://doi.org/10.1016/j.jip.2020.107370>.
15. Ottati S., Chiapello M., Galetto L., **Bosco D.**, Marzachi C. and Abbà S., 2020. New viral sequences identified in the Flavescence dorée phytoplasma vector *Scaphoideus titanus*. *Viruses*, 12(3): 287.
16. Bodino, N., Cavalieri, V., Dongiovanni, C., Saladini, M. A., Simonetto, A., Volani, S., Plazio E., Altamura G, Tauro D., Gilioli G. and **Bosco D.** 2020. Spittlebugs of Mediterranean Olive Groves: Host-Plant Exploitation throughout the Year. *Insects*, 11(2), 130.
17. Bodino N., Cavalieri V., Dongiovanni C., Plazio E., Saladini M.A., Volani S., Simonetto A., Fumarola G., Di Carolo M., Porcelli F., Gilioli G., **Bosco D.**, 2019. Phenology, seasonal abundance and stage-structure of spittlebug (Hemiptera: Aphrophoridae) populations in olive groves in Italy. *Scientific Reports* [www.nature.com/articles/s41598-019-54279-8](http://www.nature.com/articles/s41598-019-54279-8)
18. Cavalieri V., Altamura G., Fumarola G., di Carolo M., Saponari M., Cornara D., **Bosco D.**, Dongiovanni C., 2019. Transmission of *Xylella fastidiosa* Subspecies Pauca Sequence Type 53 by Different Insect Species. *Insects*, 10(10), 324; <https://doi.org/10.3390/insects10100324>
19. Cornara D., Ripamonti M., Morente M., Garzo E., **Bosco D.**, Moreno A., Fereres A., 2019. Artificial diet delivery system for *Philaenus spumarius*, the European vector of *Xylella fastidiosa*. *Journal of Applied Entomology*, 143:882–892. DOI: 10.1111/jen.12655
20. Galetto L., Pegoraro M., Marzachi C., Rossi E., Lucchi A., and **Bosco D.**, 2019. Potential role of the alien planthopper *Ricania speculum* as vector of Flavescence dorée phytoplasma. *European Journal of Plant Pathology*, [doi.org/10.1007/s10658-019-01731-0](https://doi.org/10.1007/s10658-019-01731-0).
21. Rossi M., Pegoraro M., Ripamonti M., Abbà S., Beal D., Giraudo A., Veratti F., Malembic-Maher S., Salar P., **Bosco D.**, and Marzachi C., 2019. Genetic diversity of Flavescence dorée phytoplasmas at vineyard scale. *Applied and Environmental Microbiology*, DOI: 10.1128/AEM.03123-18.
22. Dongiovanni, C., Cavalieri, V., Bodino, N., Tauro, D., Di Carolo, M., Fumarola, G., ... & **Bosco, D.**, 2018. Plant selection and population trend of spittlebug immatures (Hemiptera: Aphrophoridae) in olive groves of the Apulia Region of Italy. *Journal of Economic Entomology*, 112(1), 67–74.
23. Galetto L., Abbà S., Rossi M., Vallino M., Pesando M., Arricau-Bouvery, ., Dubrana M.P., Chitarra W., Pegoraro M, **Bosco D.** and Marzachi C., 2018. Two phytoplasmas elicit different responses in the insect vector *Euscelidius variegatus* Kirschbaum. *Infection and immunity*, 86(5), e00042-18.

24. Arricau-Bouvery N., Duret S., Dubrana M. P., Batailler B., Desqué D., Béven L., Danet J.L., Monticone M., **Bosco D.**, Malembic-Maher S. and Foissac X., 2018. Variable membrane protein A of flavescence dorée phytoplasma binds the midgut perimicrovillar membrane of *Euscelidius variegatus* and promotes adhesion to its epithelial cells. *Applied and environmental microbiology*, 84(8), e02487-17.
25. Cornara D., **Bosco D.**, and Fereres A., 2018. *Philaenus spumarius*: when an old acquaintance becomes a new threat to European agriculture. *Journal of Pest Science*, 1-16.
26. Maggi F., **Bosco D.**, Galetto L., Palmano S. and Marzachì C., 2017. Space-Time Point Pattern Analysis of Flavescence Dorée Epidemic in a Grapevine Field: Disease Progression and Recovery. *Frontiers in Plant Science* 7:1987. doi: 10.3389/fpls.2016.01987
27. Cornara D., Cavalieri V., Dongiovanni C., Altamura G., Palmisano F., **Bosco D.**, Porcelli F., Almeida R.P.P., Saponari M., 2017. Transmission of *Xylella fastidiosa* by naturally infected *Philaenus spumarius* (Hemiptera, 2 Aphrophoridae) to different host plants. *Journal of Applied Entomology*, 141, 1-2: 80-87.
28. Cornara D., Saponari M., Zeilinger A.R., de Stradis A., Boscia D., Loconsole G., **Bosco D.**, Martelli G.P., Almeida R.P.P., Porcelli F., 2017. Spittlebugs as vectors of *Xylella fastidiosa* in olive orchards in Italy. *Journal of Pest Science*, DOI: 10.1007/s10340-016-0793-0.
29. Miliordos, D. E., Galetto, L., Ferrari, E., Pegoraro, M., Marzachì, C., & **Bosco, D.** 2017. Acibenzolar-S-Methyl May Prevent Vector-Mediated Flavescence Dorée Phytoplasma Transmission, But Is Ineffective In Inducing Recovery Of Infected Grapevines. *Pest Management Science*. Doi 10.1002/ps.4303
30. Bertin S., Cavalieri V., Gribaudo I., Sacco D., Marzachì C. and **Bosco D.**, 2016. Transmission of Grapevine virus A and Grapevine leafroll associated virus 1 and 3 by *Heliococcus bohemicus* (Hemiptera: Pseudococcidae) nymphs from plants with mixed infections. *Journal of Economic Entomology*, 109(4), 1504-1511. <http://dx.doi.org/10.1093/jee/tow120>
31. Bertin, S., Pacifico, D., Cavalieri, V., Marzachì, C., & **Bosco, D.** 2016. Transmission of Grapevine virus A and Grapevine leafroll-associated viruses 1 and 3 by *Planococcus ficus* and *Planococcus citri* fed on mixed-infected plants. *Annals of Applied Biology*, 169, 53–63.
32. Galetto, L., Miliordos, D. E., Pegoraro, M., Sacco, D., Veratti, F., Marzachì, C., & **Bosco, D.**, 2016. Acquisition of Flavescence dorée phytoplasma by *Scaphoideus titanus* ball from different Grapevine varieties. *International Journal of Molecular Sciences*, 17(9), 1563.
33. Rashidi M., Galetto L., **Bosco D.**, Bulgarelli A., Vallino M., Veratti F., Marzachì C. 2015. Role of the major antigenic membrane protein in phytoplasma transmission by two insect vector species. *BMC Microbiology*, 15: 193. DOI 10.1186/s12866-015-0522-5.
34. Pacifico, D., Galetto, L., Rashidi, M., Abbà, S., Palmano, S., Firrao, G., **Bosco D.**, Marzachì, C. 2015. Decreasing Global Transcript Levels over Time Suggest that Phytoplasma Cells Enter Stationary Phase during Plant and Insect Colonization. *Applied and Environmental Microbiology*, 81(7), 2591-2602.

35. Maggi F., Galetto L., Marzachì C., **Bosco D.** 2014. Temperature-dependent transmission of “*Candidatus Phytoplasma asteris*” by the vector leafhopper *Macrostelus quadripunctulatus* Kirschbaum. *Entomologia*: 2: 202, pp87-94.
36. Saponari M., Loconsole G., Cornara D., Yokomi R.K., De Stradis A., Boscia D., **Bosco D.**, Martelli G.P., Krugner R., Porcelli F., 2014. Infectivity and Transmission of *Xylella fastidiosa* by *Philaenus spumarius* (Hemiptera: Aphrophoridae) in Apulia, Italy. *Journal of Economic Entomology* 107(4): 1316-1319; DOI: <http://dx.doi.org/10.1603/EC14142>
37. Rashidi M., D’Amelio R., Galetto L., Marzachì C., and **Bosco D.**, 2014. Interactive transmission of two phytoplasmas by the vector insect. *Annals of Applied Biology*, 165: 404-413. doi:10.1111/aab.12146
38. Galetto L., Miliordos D., Roggia C., Rashidi M., Sacco D., Marzachì C., **Bosco D.**, 2014. Acquisition capability of the grapevine Flavescence dorée by the leafhopper vector *Scaphoideus titanus* Ball correlates with phytoplasma titre in the source plant. *Journal of Pest Science*, 87: 671-679. ISSN: 1612-4758. DOI 10.1007/s10340-014-0593-3.
39. Roggia C., Caciagli P., Galetto L., Pacifico D., Veratti F., **Bosco D.** and Marzachì C. 2014. Flavescence dorée phytoplasma titre in field-infected Barbera and Nebbiolo grapevines. *Plant Pathology* 63: 31-41. Doi: 10.1111/ppa.12068
40. Galetto L., **Bosco D.** and Marzachì C. 2013. Selection of reference genes from two leafhopper species challenged by phytoplasma infection, for gene expression studies by RT-qPCR. *BMC Research Notes* 2013 6:409 (10 pp) doi:10.1186/1756-0500-6-409.
41. Vitali M., Chitarra V., Galetto L., **Bosco D.**, Marzachì C., Gullino M.L., Spanna F., Lovisolo C., 2013. Flavescence dorée phytoplasma deregulates stomatal control of photosynthesis in *Vitis vinifera*. *Annals of Applied Biology* 162: 335–346.
42. Maggi F., Marzachì C., **Bosco D.**, 2013. A stage-structured model of *Scaphoideus titanus* in vineyards. *Environmental Entomology* 42(2): 181-193. DOI: <http://dx.doi.org/10.1603/EN12216>.
43. Sampò S., Massa, N., Cantamessa S., D’Agostino U., **Bosco D.**, Marzachì C., Berta G., 2012. Effects of two AM fungi on phytoplasma infection in the model plant *Chrysanthemum carinatum*. *Agricultural And Food Science* 21(1): 39-51.
44. Palomera V., Bertin S., Rodríguez A., **Bosco D.**, Virla E., Moya-Raygoza G., 2012. Is there any genetic variation among native Mexican and Argentinian populations of *Dalbulus Maidis* (Hemiptera: Cicadellidae)? *Florida Entomologist*, 95(1):150-155.
45. Tsai C.W., **Bosco D.**, Daane K.M., Almeida R.P.P., 2011. Effect of Host Plant Tissue on the Vector Transmission of Grapevine leafroll-associated virus 3. *Journal of Economic Entomology* 104(5): 1480-1485.
46. Galetto L., **Bosco D.**, Balestrini R., Genre A., Fletcher J., Marzachì C., 2011. The Major Antigenic Membrane Protein of “*Candidatus Phytoplasma asteris*” Selectively Interacts with ATP Synthase and Actin of Leafhopper Vectors. *PLoS ONE*, 6(7), e22571.

47. D'Amelio R., Berta G., Gamalero E., Massa N., Avidano L., Cantamessa S., D'Agostino G., **Bosco D.**, Marzachì C., 2011. Increased plant tolerance against chrysanthemum yellows phytoplasma ('*Candidatus Phytoplasma asteris*') following double inoculation with *Glomus mosseae* BEG12 and *Pseudomonas putida* S1Pf1Rif. *Plant Pathology*, 60: 1014-1022.
48. Boursier C.M., **Bosco D.**, Coulibaly A., Negre M. 2011. Are traditional neem extract preparations as efficient as the azadirachtin A commercial formulation? *Crop Protection* 30: 318-322.
49. Galetto L., Marzachì C., Demichelis S. and **Bosco D.** 2011. Host plant determines the phytoplasma transmission competence of *Empoasca decipiens* (Hemiptera: Cicadellidae). *Journal of Economic Entomology*, 104(2): 360-366.
50. Bertin S., Picciau L., Acs Z., Alma A., **Bosco D.**, 2010. Molecular identification of the *Hyalesthes* species (Hemiptera: Cixiidae) occurring in vineyard agroecosystems. *Annals of Applied Biology*, 157, 435–445.
51. Gamalero E., D'Amelio R., Musso C., Cantamessa S., Pivato S., D'Agostino G., Duan J., **Bosco D.**, Marzachì C., Berta G. 2010. Effects of *Pseudomonas putida* S1Pf1Rif against chrysanthemum yellows phytoplasma infection. *Phytopathology*, 100: 805-813.
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53. Bertin S., Cavalieri V., Graziano C., **Bosco D.**, 2010. Survey of mealybug (Hemiptera: Pseudococcidae) vectors of Ampelovirus and Vitivirus in vineyards of northwestern Italy. *Phytoparasitica*, 38: 401-409.
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56. Marzachì C., Coulibaly A., **Bosco D.**, 2009. Cotton virescence phytoplasma and its weed reservoir in Mali. *Journal of Plant Pathology*, 91 (3): 727-731.
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64. **Bosco D.**, Galetto L., Leoncini P., Saracco P., Raccach B., Marzachi C., 2007. Interrelationships between "*Candidatus Phytoplasma asteris*" and its leafhopper vectors (Homoptera: Cicadellidae). Journal of Economic Entomology, 100(5): 1504-1511.
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66. D'Amelio R., Marzachi C., **Bosco D.**, 2007. Double infection of "*Candidatus phytoplasma asteris*" and "*Candidatus phytoplasma vitis*" in the vector *Euscelidius variegatus* Kirschbaum. Proceedings First International Phytoplasma Working Group Meeting Bologna, Italy, 12-15 November. Bulletin of Insectology 60(2): 223-224.
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68. **Bosco D.**, Galetto L., Leoncini P., Saracco P., Raccach B., Marzachi C., 2007. Pattern of chrysanthemum yellows phytoplasma (CYP) multiplication in three leafhopper vector species (Cicadellidae Deltocephalinae). Proceedings First International Phytoplasma Working Group Meeting Bologna, Italy, 12-15 November. Bulletin of Insectology 60(2): 227-228.
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#### BOOK CHAPTERS

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