

Effects of a Neem-based Insecticide on Different Immature Life Stages of the Leafminer *Liriomyza sativae* on Tomato

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References Cited

- Azam, K.M., Raeesi, A.A., Srikanthakumar, A. and Bowers, W.S. (2003)** Control of leafminer (*Liriomyza trifolii* Burgess) on cucumber by plant extracts. *Crop Res.* 25:567-571.
- Coudriet, D.L., Prabhaker, N. and Meyerdirk, D.E. (1985)** Sweetpotato whitefly (Homoptera: Aleyrodidae): Effects of neem-seed extract on oviposition and immature stages. *Environ. Entomol.* 14:776-779.
- Gonzalez, M.S., Nogueira, N.F.S., Mello, C.B., De Souza, W., Schaub, G.A. Azambuja, P. et al. (1999)** Influence of brain and azadirachtin on *Trypanosoma cruzi* development in the vector, *Rhodnius prolixus*. *Exp. Parasitol.* 92:100-108.
- Isman, M.B. (1999)** Neem and related natural products. *in:* Hall, F.R. and Menn, J.J. [Eds.] *Biopesticides: Use and Delivery.* Humana, Totowa, NJ, USA. pp. 139-153.
- Isman, M.B., Koul, O., Luczynski, A. and Kaminski, J. (1990)** Insecticidal and antifeedant bioactivities of neem oils and their relationship to azadirachtin content. *J. Agric. Food Chem.* 38:1406-1411.
- Issa, S. and Marcano, R. (1993)** Spatial and vertical distribution of *Liriomyza sativae* (Blanchard) (Diptera: Agromyzidae) on tomato. *Bol. Entomol. Venez.* 8:115-122.
- Johnson, M.W., Oatman, E.R. and Wyman, J.A. (1980)** Effects of insecticides on populations of the vegetable leafminer and associated parasites on summer pole tomatoes. *J. Econ. Entomol.* 73:61-66.
- Johnson, S., Dureja, P. and Dhingra, S. (2003)** Photostabilizers for Azadirachtin-A (a neem-based pesticide). *J. Environ. Sci. Health B.* 38:451-462.
- Larew, H.G. (1987)** Use of neem seed kernel extract in a developed country: *Liriomyza trifolii* leafminer as a model case. *in:* Schmutterer, H. and Ascher, K.R.S. [Eds.] *Natural Pesticides from the Neem Tree (Azadirachta indica A. Juss) and other Tropical Plants.* *Proc. 3rd International Conf.* (Nairobi, Kenya, 1986), pp. 375-385.
- Lowery, D.T. and Isman, M.B. (1995)** Toxicity of neem to natural enemies of aphids. *Phytoparasitica* 23:297-306.
- Mason, G.A., Johnson, M.W. and Tabashnik, B.E. (1987)** Susceptibility of *Liriomyza sativae* and *L. trifolii* (Diptera: Agromyzidae) to permethrin and fenvalerate. *J. Econ. Entomol.* 80:1262-1266.
- Medina, F., Budia, F., Del Estal, P. and Vinuela, E. (2004)** Influence of azadirachtin, a botanical insecticide, on *Chrysoperla carnea* (Stephens)

- reproduction: toxicity and ultrastructural approach. *J. Econ. Entomol.* 97:43-50.
- Meisner, J., Melamed-Madjar, V., Yathom, S. and Ascher, K.R.S. (1987)** The influence of neem on the European corn borer (*Ostrinia nubilalis*) and the serpentine leafminer (*Liriomyza trifolii*). *in: Schmutterer, H. and Ascher, K.R.S. [Eds.] Natural Pesticides from the Neem Tree (Azadirachta indica A. Juss) and other Tropical Plants. Proc. 3rd International Conf. (Nairobi, Kenya, 1986), pp. 461-447.*
- Mordue, A.J. (1998)** Azadirachtin: A review of its mode of action in insects. *in: Kleeberg, H. [Ed.] Proc. 7th Workshop on Practice Oriented Results on Use and Production of Neem Ingredients and Pheromones (Wetzlar, Germany, 1997), pp. 1-4.*
- Mordue (Luntz), A.J. and Blackwell, A. (1993)** Azadirachtin, an update. *J. Insect Physiol.* 39:903-924.
- Naumann, K. and Isman, M.B. (1996)** Toxicity of neem (*Azadirachta indica* A. Juss) seed extracts to larval honeybees and estimation of dangers from field application. *Am. Bee J.* 136:518-520.
- Oatman, E.R. and Kennedy, G.G. (1976)** Methomyl induced outbreak of *Liriomyza sativae* on tomato. *J.Econ. Entomol.* 69:667-668.
- Parkman, P. and Pienkowski, R.L. (1990)** Sublethal effects of neem seed extract on adults of *Liriomyza trifolii* (Diptera: Agromyzidae). *J. Econ. Entomol.* 83:1246-1249.
- Parrella, M.P. (1987)** Biology of *Liriomyza*. *Annu. Rev. Entomol.* 32:201-224.
- Petitt, F.L. (1990)** Distinguishing larval instars of the vegetable leafminer *Liriomyza sativae* (Diptera: Agromyzidae). *Fla. Entomol.* 73:280-286.
- Raguraman, S. and Singh, R.P. (1999)** Biological effects of neem (*Azadirachta indica*) seed oil on an egg parasitoid, *Trichogramma chilonis*. *J. Econ. Entomol.* 92:1274-1280.
- Rembold, H. (1989)** Isomeric azadirachtins and their mode of action. *in: Jacobson, M. [Ed.] Focus on Phytochemical Pesticides. Vol. 1: The Neem Tree. CRC Press, Boca Raton, FL, USA. pp. 47-67.*
- Rembold, H. (2002)** Growth and metamorphosis. *in: Schmutterer, H. [Ed.] The Neem Tree. Neem Foundation, Juhu Scheme, Mumbai, India. pp. 237-254.*
- SAS Inst. (2002)** SAS/Stat User's Guide. SAS Institute, Cary, NC, USA.
- Schmutterer, H. (1990)** Properties and potential of natural pesticides from the neem tree, *Azadirachta indica*. *Annu. Rev. Entomol.* 35:271-297.
- Singh, S. and Singh, R.P. (1998)** Neem (*Azadirachta indica*) seed kernel extracts and azadirachtin as oviposition deterrents against the melon fly (*Bactrocera cucurbitae*) and the oriental fruit fly (*Bactrocera dorsalis*). *Phytoparasitica* 26:191-197.
- Spencer, K.A. (1973)** Agromyzidae (Diptera) of economic importance. *Ser. Entomol.* 9:1-418.
- Verkerk, R.H.J. and Wright, D.J. (1993)** Biological activity of neem seed kernel extracts and synthetic azadirachtin against larvae of *Plutella xylostella* L. *Pestic. Sci.* 37:83-91.
- Von Elling, K., Borgemeister, C., Setamou, M. and Poehling, H..M. (2002)** The effect of NeemAzal-T/S, a commercial neem product, on different

developmental stages of the common greenhouse whitefly *Trialeurodes vaporariorum* Westwood (Hom., Aleyrodidae). *J. Appl. Entomol.* 126:40-45.

- Waterhouse, D.F. and Norris, K.R. (1987)** Biological Control: Pacific Prospects. Inkata Press, Melbourne, Australia.
- Webb, R.E., Hinebaugh, M.A., Lindquist, R.K. and Jacobson, M. (1983)** Evaluation of aqueous solution of neem seed extract against *Liriomyza sativae* and *L. trifolii* (Diptera: Agromyzidae). *J. Econ. Entomol.* 76:357-362.
- Weintraub, P.G. and Horowitz, A.R. (1997)** Systemic effects of a neem insecticide on *Liriomyza huidobrensis* larvae. *Phytoparasitica* 25:283-289.
- Zar, J.H. (1999)** Biostatistical Analysis. 4th ed. Prentice Hall, Upper Saddle River, NJ, USA.
- Zehnder, G. and Trumble, J. (1984)** Spatial and diel activity of *Liriomyza* spp. (Diptera: Agromyzidae) in fresh market tomatoes. *Environ. Entomol.* 13:1411-1416.
- Zoebisch, T.G. and Schuster, D.J. (1987)** Suitability of foliage of tomatoes and three weed hosts for oviposition and development of *Liriomyza trifolii* (Diptera: Agromyzidae). *J. Econ. Entomol.* 80:758-762.