EPPO Datasheet: *Nemorimyza maculosa*

Last updated: 2023-12-01

IDENTITY

Preferred name: *Nemorimyza maculosa*
Authority: (Malloch)
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Diptera: Agromyzidae
Other scientific names: *Agromyza guaranitica* Brethes, *Agromyza maculosa* Malloch, *Amauromyza maculosa* (Malloch), *Dizygomyza maculosa* Blanchard, *Phytobia maculosa* (Malloch)
Common names: burdock leaf miner, chrysanthemum leaf miner
[view more common names online...]
EPPO Categorization: A1 list
[view more categorizations online...]
EU Categorization: Quarantine pest ((EU) 2019/2072 Annex II A)
EPPO Code: AMAZMA

Notes on taxonomy and nomenclature

Nemorimyza maculosa belongs to a small genus (5 species) of leaf mining flies predominantly associated with Asteraceae hosts. Although previously included in the genus *Amauromyza* Hendel, subgenus *Annimyzella* (Spencer, 1981), its placement within *Nemorimyza* (Zlobin, 1996) has been supported by molecular phylogenetic studies (Scheffer *et al*., 2007).

HOSTS

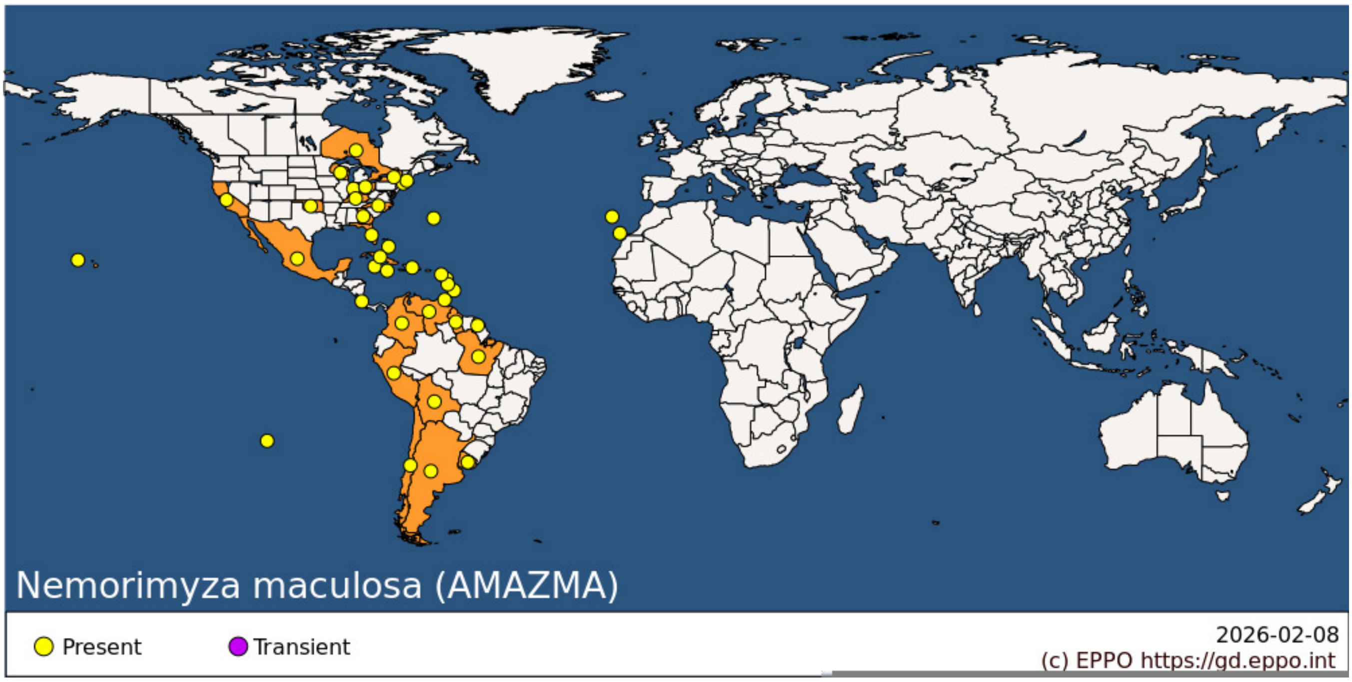
Feeding widely on Asteraceae, *N. maculosa* has been recorded on more than 30 genera of host plants in this family. In the EPPO region the potential host range would include ornamental plants such as *Aster* spp., chrysanthemums, *Dahlia* spp., as well as vegetable crops such as lettuce (*Lactuca sativa*), sunflower (*Helianthus annuus*) and artichoke (*Cynara cardunculus*) (Spencer, 1990; Benavent-Corai *et al*., 2005; Eisman & Lonsdale, 2019; Monteiro *et al*., 2019). Isolated reports on Brassicaceae, Solanaceae and Convolvulaceae (Sanabria de Arevalo, 1994; Spencer *et al*., 1992) are considered doubtful and require further confirmation (EFSA, 2020).

Host list: *Acanthospermum sp.*, *Ageratum conyzoides*, *Arctium lappa*, *Arctotis sp.*, *Argyranthemum frutescens*, *Artemisia vulgaris*, *Aster sp.*, *Baccharis douglasii*, *Baccharis halimifolia*, *Bellis sp.*, *Bidens alba*, *Bidens pilosa*, *Calendula officinalis*, *Chromolaena odorata*, *Chrysanthemum indicum*, *Chrysanthemum x morifolium*, *Chrysanthemum*, *Conyza apurensis*, *Conyza sp.*, *Cynara cardunculus*, *Dahlia pinnata*, *Emilia coccinea*, *Emilia fosbergii*, *Emilia sonchifolia*, *Erechtites hieraciifolius*, *Erechtites valerianifolius*, *Erigeron canadensis*, *Eupatorium sp.*, *Gaillardia aristata*, *Gamochaeta pensylvanica*, *Gerbera jamesonii*, *Gnaphalium sp.*, *Grindelia squarrosa*, *Helenium sp.*, *Helianthus annuus*, *Lactuca sativa*, *Lagascea mollis*, *Leucanthemum vulgare*, *Leucanthemum x superbum*, *Melanthera aspera*, *Melanthera nivea*, *Mikania micrantha*, *Packera glabella*, *Pericallis x hybrida*, *Solidago sp.*, *Sonchus asper*, *Symphyotrichum novi-belgii*, *Synedrella nodiflora*, *Tagetes erecta*, *Tagetes patula*, *Tagetes sp.*, *Tagetes tenuifolia*, *Tanacetum parthenium*, *Tanacetum vulgare*, *Taraxacum sp.*, *Tithonia rotundifolia*, *Zinnia elegans*

GEOGRAPHICAL DISTRIBUTION

Originally described from the United States, *N. maculosa* probably originated from tropical or subtropical areas of South America, as suggested by its current distribution. Supporting this hypothesis, the leaf miner is found outdoors in warmer eastern USA states, while in the most northern states and in Canada, it occurs in greenhouses (EFSA, 2020). This species is widely distributed in the Americas, particularly in the Neotropical area (Spencer, 1990;

Martinez & Etienne, 2002; Valladares *et al*., 2011; Valenzuela-Escoboza *et al*., 2017; Lonsdale, 2021; Monteiro *et al*., 2019. The first records of *N. maculosa* for the Old World and specifically the EPPO Region are relatively recent and restricted to isolated areas (Madeira and Canary Islands) (?erný *et al*., 2018). Given the considerable touristic movement between the Atlantic islands and Continental Europe, it might be only a question of time until the leaf miner becomes transferred to plant hosts on the continent (?erný *et al*., 2018).



EPPO Region: Portugal (Madeira), Spain (Islas Canárias)
North America: Canada (Ontario), Mexico, United States of America (California, Connecticut, Florida, Georgia, Hawaii, Indiana, Kentucky, Massachusetts, New York, North Carolina, Ohio, Oklahoma, Wisconsin)
Central America and Caribbean: Bahamas, Barbados, Bermuda, Cayman Islands, Costa Rica, Cuba, Dominican Republic, Guadeloupe, Jamaica, Martinique, Saint Kitts and Nevis, Trinidad and Tobago
South America: Argentina, Bolivia, Brazil (Para), Chile (Easter Island), Colombia, French Guiana, Guyana, Peru, Uruguay, Venezuela

BIOLOGY

Nemorimyza maculosa is multivoltine, completing several generations in one year. Ota & Nishida (1966) recorded a development time of 22 to 28 days at about 26°C (3–4 days for eggs, 6–8 days for larvae and 13–16 days for pupae). Duration of the life cycle varies with temperature and host plants, e.g. on artichoke (at 24 - 26°C) the life cycle of *N. maculosa* lasted 22.6 days (eggs hatched in 2 days; first and second larval instars lasted 2 days each, third instar took 3 days, and the pupa lasted 11 to 14 days) whereas on sunflower the life cycle took 19.8 days in total (egg, first and second larval instars lasted 1-2 days each one; third larval instar 2.5 - 3 days, and pupa 10 - 12 days) (Enriquez *et al*., 2014). Sex ratio (M: F) was 1: 1.5.

Oviposition begins at sunrise, peaks between mid-morning and noon, then decreases towards sunset. Females insert usually 2 – 4 eggs close to each other under the leaf epidermis and near the leaf margins. Total number of eggs and length of the oviposition period varied with individual flies and with the host plant (Ota & Nishida 1966). In young leaves, egg extrusion might lead to increased mortality if eggs are ejected by the growing tissue and thus exposed to the external environment (Enriquez *et al*., 2014; Videla & Valladares, 2007). After hatching, larvae feed within the leaf, consuming the mesophyll and creating a large communal blotch mine (i.e. a mine where several larvae are developing). Third instar larvae cut semicircular exit slits in the leaf epidermis and drop to the ground where they pupate under debris or up to 3 cm into the soil.

Adults emerge from pupariae mostly between 6 and 11 a.m.; they are diurnal, most active during the morning. Adult females live longer than males. Otta & Nishida (1966) recorded a lifespan of 14 days for females and 7 days for males, but much longer adult lifespans (females: 36 – 41 days, males: 21 – 32 days) and significant host plant effects on longevity were found by Enriquez *et al*. (2014). Female flies use their ovipositor to puncture host plant leaves, causing wounds which serve as sites for oviposition but also for feeding on the sap exudates. This causes whitish or brown stipples on the leaves, with feeding punctures destroying more cells and being more clearly visible than oviposition punctures. Males are unable to puncture leaves but they feed at the punctures produced by females. In the laboratory, both males and females feed on dilute honey (Ota & Nishida, 1966; Enriquez *et al*., 2014).

DETECTION AND IDENTIFICATION

Symptoms

The first symptom of leaf miner attack on plants is leaf stippling, caused by feeding and oviposition punctures which appear as white (sometimes becoming brown) speckles, about 0.15 mm in diameter. Oviposition punctures tend to be smaller and more uniformly round.

Feeding by *N. maculosa* larvae produces a conspicuous blotch mine, which is more noticeable on the upper side of the leaves. The mine is initially whitish and soon becomes predominantly brown with dampened black areas. Most of the mesophyll (upper as well as lower parenchyma) is consumed, leading to necrosis of the affected area. Several larvae (frequently 2 - 8) are found within a wide communal mine, which usually lacks the initial linear tract seen in blotch mines of other species such as *N. posticata* (Eiseman & Lonsdale, 2018).

A positive identification requires examination of the adult flies. *Nemorimyza maculosa* is easily differentiated from the other species in the genus by having a distinctive dark spot on the otherwise white halteres; whitish squamae and fringe; dorsocentral presutural seta present; black abdomen and curved, divergent tubules of the bifid distiphallus (Monteiro *et al*., 2019; Sousa & Couri, 2021). The combination of presence of prescutellar bristles and Phytomyzinae-like wing vein pattern also help the identification (Dempewolf, 2004).

Morphology

Eggs

Oval, 0.20-0.37 mm x 0.10-0.20 mm, off-white and slightly translucent (Ota & Nishida, 1966; EFSA, 2020).

Larva

A headless maggot, yellowish white, up to 4.6 mm long when fully grown; posterior spiracles of larva (and puparium) paired, each with three pores. The puparium is oval, slightly flattened ventrally, 2.2-2.8 mm long, turning from creamy yellow to dark brown (Ota & Nishida, 1966; Enriquez *et al*., 2014).

Adult

Small, shiny black, compact-bodied flies, about 2.2 to 2.7 mm in body length. Wing length 2.2-2.3 mm (males), 2.2-3.1 mm (females). Head, mesonotum, pleura and legs entirely black; squamae and fringe silvery white; halteres mostly white, but knob with a conspicuous dark spot above (Spencer, 1973; Lonsdale, 2021). Females are larger than males and body size varies depending on larval host plant (Enriquez *et al*., 2014). Distinctive male genitalia: distiphallus with broad, dark, basal section apically ending in a pair of pale diverging and curved tubules almost as long as basal section (Monteiro *et al*., 2019; Lonsdale, 2021).

Detection and inspection methods

Visual inspection of leaves searching for blotch leaf mines and feeding / oviposition punctures, should allow detection of infested plant material. Mined leaves should then be incubated to obtain adults for a more reliable identification, which might need to be referred to a specialist. Morphological keys for adults are available to identify the species (e.g. Spencer, 1963; Spencer & Steyskal, 1986; De Sousa & Couri, 2021).

Inspection of crops can also be carried out in situ, again by visual inspection of leaves followed by adult rearing. Adult leaf miner flies can be monitored by sweeping with gauze nets over Asteraceae crops or associated vegetation (e.g. ?erný *et al.*, 2018); by using Malaise or water traps (Scheirs *et al*., 1997), or by placing yellow sticky traps in fields and, for protected crops, using traps in greenhouses (Monica *et al*., 2021).

PATHWAYS FOR MOVEMENT

Adult flies are capable of limited flight, although they may be carried passively by wind currents (Yoshimoto & Gressitt, 1964). Dispersal over long distance is mediated by transportation of host plant material. Even cut flowers can present a risk as a means of dispersal considering, for example, that the vase life of chrysanthemums is sufficient to allow completion of the life cycle of the pest (Spencer, 1973).

PEST SIGNIFICANCE

Economic impact

The large blotch mines of *N. maculosa* cause considerable damage to chrysanthemums and other glasshouse ornamentals (Weigel, 1923; Weigel & Sasser, 1923; Stegmaier, 1967). Although there are few reports of serious outbreaks, even slight damage to plants in the flower industry can cause economic losses. In California, USA, regular low-level damage to young plants calls for constant vigilance (EFSA, 2020). Severe damage to lettuce crops has also been reported (Spencer, 1973).

Damage is caused by females puncturing leaves for feeding and oviposition and by subsequent larval mining within leaves. The photosynthetic ability of the plants is often greatly reduced as the chlorophyll-containing cells are destroyed, reducing plant metabolism and vigour (Spencer, 1973). Severely infested leaves may fall, consequently exposing plant stems to wind action, whereas flower buds and developing fruit could be damaged by excessive sunlight exposure (Musgrave *et al*., 1975). Aesthetic damage resulting from the presence of unsightly larval mines and adult punctures in edible leaves (e.g. lettuce) or ornamental plants can further reduce the value of crops or even render them unmarketable (Smith *et al*., 1962; Musgrave *et al*., 1975; Dempewolf, 2004). In young plants and seedlings, mining may cause considerable delay in plant development leading to plant loss. Leaf miner damage may also facilitate penetration of bacterial and fungal pathogens into the leaves via female feeding punctures (Dempewolf, 2004).

Control

Some insecticides, particularly pyrethroids, are effective but leaf miner resistance can make control difficult (Parrella *et al*., 1984). Translaminar insecticides such as abamectin, cyromazine, spinosyns and azadirachtine (Reitz *et al*., 2013) have shown efficacy against leaf miner larvae while being compatible with biological control (Kaspi & Parrella, 2002; Salvo & Valladares, 2007; Mani, 2022).

Natural enemies represent a strong mortality source for leaf miners and periodically suppress their populations (Spencer, 1973). Leaf miner predators include birds, spiders and insects (Coleoptera, Hemiptera), whereas parasitoids include Hymenoptera species within Eulophidae, Pteromalidae, Braconidae and Figitidae. Conservation biological control and inoculative releases, mainly of parasitoid insects, are being considered as relevant strategies for control of leaf miner pest species (Salvo & Valladares, 2007). Parasitoids of *N. maculosa* include *Chrysocharis* sp., *Diaulinopsis callichroma*, *Derostenus variipes*, *Derostenus* sp. in Florida (Stegmaier, 1967); *Opius* sp. (Hym: Braconidae), *Halticoptera* sp. (Hym: Pteromalidae), *Ganaspidium* sp. (Hym: Eucoilidae), *Chrysocharis* sp. (Hym: Eulophidae) in Peru (Enriquez *et al*., 2014), and *Phaedrotoma mesoclypealis* in Argentina, the latter causing 19% parasitism on *N. maculosa* (Valladares *et al*., 1999).

Phytosanitary risk

Nemorimyza maculosa has the potential to become a major pest of a wide variety of ornamental and vegetable crops grown under glass or as protected crops in the EPPO region. This species could also cause damage to crops grown in the open in the warmer parts of the region. Given its presence in relatively close island areas, it seems likely that the species could establish in the continental part of the EPPO region (?erný *et al*., 2018).

The different life stages of the leaf miner could use different pathways to enter the EPPO region. Eggs and larvae could be introduced either within plants for planting with foliage, or within fresh leafy hosts for consumption (e.g. lettuce) or within cut flowers and branches with foliage (e.g. chrysanthemums, dahlias). Pupae could be transported within soil and growing media, but the import of soil or growing medium as such from third countries is prohibited in most EPPO member countries, therefore the entry of *N. maculosa* pupae is prevented.

PHYTOSANITARY MEASURES

All stages are killed within a few weeks by cold storage at 0°C. Newly laid eggs are, however, the most resistant stage and therefore it is recommended that cuttings of infested ornamental plants be maintained under normal glasshouse conditions for 3-4 days after lifting, to allow eggs to hatch. Subsequent storage of the plants at 0°C for 1-2 weeks should then kill off the leaf miner larvae (Webb & Smith, 1970; CABI, 2022).

To avoid the introduction of *N. maculosa* (and other leaf miner pest species such as *Liriomyza huidobrensis, L. trifolii* and *L. sativae*), it could be recommended that plants for planting (except seeds) of host plants, such as chrysanthemums, *Aster*, *Gerbera, Calendula, Cynara*, lettuces, sunflower, from countries where the pest occurs must have been inspected at least every month during the previous 3 months and found free from the pest. General guidance on how to conduct inspections of places producing vegetable plants for planting under protected conditions can be found in the EPPO Standard PM 3/77 (EPPO, 2022). It could also be recommended that consignments of cut flowers and leafy vegetables should originate from a country free from *N. maculosa* or should have been inspected and found free from the pest immediately before export.

REFERENCES

Benavent-Corai J, Martinez M & Peydró, RJ (2005) Catalogue of the hosts-plants of the world Agromyzidae (Diptera). *Bollettino di Zoologia agraria e di Bachicoltura* Ser. II **37**, Suppl, 1-97.

CABI (2022) *Nemorimyza maculosa* (chrysanthemum leaf miner). PlantwisePlus Knowledge Bank. https://doi.org/10.1079/pwkb.species.4687

?erný M, Andrade R, Gonçalves AR & von Tschirnhaus M (2018) New records of Agromyzidae (Diptera) from Portugal, with an updated checklist. *Acta Musei Silesiae, Scientiae Naturales* **67**(1), 7-57.

Dempewolf M (2004*) Arthropods of economic importance - Agromyzidae of the World* (CD-ROM). *ETI. University of Amsterdam, Amsterdam*.

EFSA (2020) EFSA Panel on Plant Health (PLH), Bragard C, Dehnen?Schmutz K, Di Serio F, Gonthier P, Jacques MA, Jaques Miret JA, Fejer Justesen A, MacLeod A Magnusson CS Milonas P, Navas?Cortés JA, Parnell S, Potting R, Reignault PL, Thulke HH, Van der Werf W, Vicent A, Yuen AV, Zappalà. Pest categorisation of *Nemorimyza maculosa*. *EFSA Journal* **18**(3), e06036. https://doi.org/10.2903/j.efsa.2020.6036

Eiseman CS & Lonsdale O (2018) New state and host records for Agromyzidae (Diptera) in the United States, with the description of thirty new species. *Zootaxa* **4479**(1), 1-156.

Enríquez L, Castillo J & Rodríguez S (2014) Biología y comportamiento de *Amauromyza maculosa* (Malloch, 1913)(Diptera: agromyzidae) en alcachofa (*Cynara scolimus* L.) y girasol (*Helianthus annus* L.). *Ecología Aplicada* **13**(2), 79-84.

EPPO (2022) EPPO Standards. Phytosanitary Procedures. PM 3/77 (2) Vegetable plants for planting under protected conditions - Inspection of places of production. *EPPO Bulletin* **52**(3), 526-543.

Kaspi R & Parrella MP (2005) Abamectin compatibility with the leafminer parasitoid *Diglyphus isaea*. *Biological Control* **35**(2), 172-179.

Lonsdale O (2021) Manual of North American Agromyzidae (Diptera, Schizophora), with revision of the fauna of the " Delmarva " states. *ZooKeys* **1051**, 1-481.

Mani M (2022) Pest Management in Horticultural Crops Under Protected Cultivation. In: *Trends in Horticultural Entomology* (Ed. By Mani, M). Springer, Singapore, 387-417.

Martinez M & Etienne J (2002). Liste systématique et biogéographique des Agromyzidae (Diptera) de la région néotropicale. *Bolletino di Zoologia agraria e di Bachicoltura* Serie II **34** (1), 25-52.

Monica SS, Vinothkumar B, Krishnamoorthy SV & Rajendran L (2021) Evaluation of different traps for the invasive leaf miner, *Liriomyza huidobrensis* in potato (*Solanum tuberosum*) fields of the Nilgiris district, Tamil Nadu, India. *Journal of Applied and Natural Science* **13**(4), 1563-1570.

Monteiro NJS, Barbosa RR & Esposito MC (2019) Agromyzidae (Diptera: Schizophora) in the state of Pará: new species and new records in Brazil. *Zootaxa* **4624**(2), 151–182.

Musgrave CA, Poe SL & Weems HV (1975) The vegetable leafminer *Liriomyza sativae* Blanchard. *Entomology Circular, Division of Plant Industry, Florida Department of Agriculture and Consumer Services* **162**, 1-4.

Ota AK & Nishida T (1966) A biological study of *Phytobia (Amauromyza) maculosa* (Diptera: Agromyzidae). *Annals of the entomological Society of America* **59**(5), 902-911.

Parrella MP, Keil CB, Morse JG (1984) Insecticide resistance in *Liriomyza trifolii*. *California Agriculture* **38**, 22-33.

Reitz SR, Gao Y & Lei Z (2013) Insecticide use and the ecology of invasive *Liriomyza* leafminer management. *Insecticides-development of safer and more effective technologies*, 235-255.

Salvo A & Valladares GR (2007) Leafminer parasitoids and pest management. *Ciencia e Investigación Agraria* **34** (3), 167-185.

Sanabria de Arevalo IS (1994) Insectos minadores (Diptera: Agromyzidae) de la Sabana de Bogotá (Cundinamarca, Colombia). *Revista colombiana de Entomología* **20**(2), 61-100.

Scheffer SJ, Winkler IS & Wiegmann BM (2007) Phylogenetic relationships within the leaf-mining flies (Diptera: Agromyzidae) inferred from sequence data from multiple genes. *Molecular phylogenetics and evolution* **42**(3), 756-775.

Scheirs J, De Bruyn L & Von Tschirnhaus M (1997) Comparison of different trapping methods in Agromyzidae (Diptera). *Journal of Applied Entomology* **121**(1?5), 429-433.

Smith FF, Boswell AL & Wave HE (1962) New chrysanthemum leaf miner species. *Florists' Review* **130**, 29-30.

Sousa VRD & Couri MS (2021) The leaf-miner *Nemorimyza* Frey, 1946 in the Neotropical region: key to species and first record of *Nemorimyza posticata* (Meigen, 1830) from Brazil (Diptera, Agromyzidae). *Revista Brasileira de Entomologia* **65**(3), e20210017.

Spencer KA (1963) A synopsis of the neotropical Agromyzidae (Diptera). *Transactions of the Royal Entomological Society of London* **115**(12), 291-389.

Spencer KA (1973) *Agromyzidae (Diptera) of economic importance* (*Series Entomologica* No. 9), 418 pp. Junk, The Hague, Netherlands.

Spencer KA (1981) *A revisionary study of the leaf-mining flies (Agromyzidae) of California* (Vol. 3273). University of California, Agriculture and Natural Resources.

Spencer KA (1990) *Host Specialization in the World Agromyzidae (Diptera)*. Dordrecht, Kluwer Academic Publishers, 444 pp.

Spencer KA & Steyskal GC (1986) Manual of the Agromyzidae (Diptera) of the United States. *Agriculture Handbook, US Department of Agriculture*

, No. 638, 478 pp.

Spencer KA, Martinez M & Etienne J (1992) The Agromyzidae (Diptera) of Guadeloupe. *Annales de la Société Entomologique de France* **28**, 251–302.

Stegmaier CE (1967) Some new host plant records and parasites of *Phytobia* (*Amauromyza*) *maculosa* in Florida (Diptera: Agromyzidae). *Florida Entomologist* **50**, 99-101.

Valenzuela-Escoboza FA, Castañeda-Vildozola A, Palacios-Torres RE, López-Martínez G, da Silva-Sombra KD, Valdez-Carrasco J & López-Valenzuela BE (2017) First record of the genus *Nemorimyza* Frey, 1946 (Diptera: Agromyzidae) for Mexico. *The Pan-Pacific Entomologist* **93**(4), 187-190.

Valladares G, Salvo A & Videla M (1999) Moscas minadoras en cultivos de Argentina. *Horticultura Argentina* **18** (44-45), 56-61.

Valladares GR, Salvo SA & Saini E (2011) Moscas minadoras del girasol y sus enemigos naturales. *Revista de Investigaciones Agropecuarias* **37**(2), 180-188.

Videla M & Valladares G (2007) Induced resistance against leafminer eggs by extrusion in young potato plants. *International journal of pest management* **53**(3), 259-262.

Webb RE & Smith FF (1970) Survival of eggs of *Liriomyza munda* in chrysanthemums during cold storage. *Journal of Economic Entomology* **63**, 1359-361.

Weigel CA (1923) Insect enemies of chrysanthemums. *US Department of Agriculture Farmers' Bulletin* No. **1306**, 36 pp.

Weigel CA & Sasser ER (1923) Insects injurious to ornamental greenhouse plants. *US Department of Agriculture Farmers' Bulletin* No. 1362, 88 pp.

Yoshimoto CM & Gressitt JL (1964) Dispersal studies on Aphididae, Agromyzidae and Cynipoidae. *Pacific Insects* **6**, 525-531.

Zlobin VV (1996) The genus *Amauromyza* Hendel (Diptera, Agromyzidae): a clarification of species of the subgenus *Annimyzella* Spencer. *International Journal of Dipterological Research* **7**, 271–280

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Datasheet history

This datasheet was first published in the EPPO Bulletin in 1984, as part of the datasheet on *Liriomyza trifolii*, and revised in the two editions of 'Quarantine Pests for Europe' in 1992 and 1997, as well as in 2023. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', 'Hosts', and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

CABI/EPPO (1992/1997) *Quarantine Pests for Europe (1st and 2nd edition)*. CABI, Wallingford (GB).

EPPO (1984) Data sheets on quarantine organisms No. 131 *Liriomyza trifolii*. *EPPO Bulletin* **14**(1), 29-37.
https://doi.org/10.1111/j.1365-2338.1984.tb01978.x

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