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Notes and Comments

First record of occurrence and damage of *Liriomyza* spp. (Diptera: Agromyzidae) in *Allium sativum* L. in Brazil

W. S. Soares[a], *M. E. S. Fernandes*[b], *B. K. R. Silva*[b], *A. Plata-Rueda*[b] and *F. L. Fernandes*[b]*

[a]Instituto de Ciências Agrárias, Universidade Federal de Uberlândia – UFU, Campus Umuarama, Av. Amazonas, bloco 2E, CEP 38400-902, Uberlândia, MG, Brasil

[b]Laboratório de Manejo Integrado de Pragas, Instituto de Ciências Agrárias, Universidade Federal de Viçosa – UFV, Campus Rio Paranaíba, MG 230, Km 8, CEP 38810-000, Rio Paranaíba, MG, Brasil

*e-mail: flaviofernandes@ufv.br

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(With 1 figure)

Liriomyza spp. (Diptera: Agromyzidae) causes losses of 54 million dollars in beans *Phaseolus vulgaris* L. and spinach *Spinacea oleracea* L. (Pratt et al., 2017).

The main agromizids that affect the system of production in the world are *Liriomyza huidobrensis* (Blanchard), *L. trifolii* (Burgess) and *L. sativae* (Blanchard) (Guantai et al., 2015). Females of these species oviposit within the leaves and larvae consume the mesophyll, and mine leaves of serpentine format (Parrella et al., 1985). Additionally, the females using her ovipositor to puncture the surface of leaf and facilitates the infection by pathogenic fungi as *Alternaria leaf* on *Solanum lycopersicum* L. (Durairaj et al., 2010). Infestations of *L. huidobrensis* in *Allium sativum* L. were reported in the Chile, China, Colombia, Indonesia and Spain (Weintraub, 2001; Weintraub et al., 2017). However, occurrences of *Liriomyza* spp. on *A. sativum* in Brazil were not reported. Higher infestations of pests and diseases in this crop may lead to changes in production and reduce the quality of the bulbs (Moura et al., 2013). Thus, the objective was to report, for the first time, the attack of the *Liriomyza* spp. on *A. sativum* in Brazil.

Liriomyza spp. was collected on 50 garlic fields from March 2017 until August 2018. The evaluated garlic cultivars were Ito (46 fields-60 ha), Chonan (1 field-20 ha), Roxo pérola de caçador (1 field-35 ha) and Gravatá (2 fields-12 ha) in the municipality of Rio Paranaíba-MG (19°12'41.3" S; 46°13'56.9" W; altitude: 1,122 m). The evaluations were performed at 15, 75 and 135 days after the emergence of garlic. Five leaves ha^{-1} were random collected in each area. The leaves were collected placed in paper bags and taken to the Laboratory of Universidade Federal de Viçosa- Campus Rio Paranaíba. After this, the leaves were cut, immersed in glasses with distilled water and placed in cages per field. Then, the variables leaves with mines, active mines (live larvae) and bulb weight (135 days after the emergence) were evaluated. The average of these variables was calculated for each area. The bulbs from plants with mines were weighed to verify the damage caused by the insect's injury. The number of plants with active mines and the weight of bulbs were analyzed by Pearson correlation analysis (P<0.05). All insects found were collected with a fine-tipped brush, packed in 70% ethyl alcohol (Table 1). Larvae, pupae, and adult images were sent for species identification. The insect was identified as *Liriomyza* spp. serpentine mines on sheets of *A. sativum* (Figure 1A, B).

Similar injuries caused by *Liriomyza* spp. were observed in *A. cepa* and *Daucus carota* L. in Brazil (Alves et al., 2014; Fernandes et al., 2017). The correlation was negative and significant between the number of leaves with mines and the weight of garlic bulbs in almost all cultivars (Figure 1). The highest correlation was found in the cultivar Ito (r= -0.78) (Table 1). This yield may be relevant if large areas of crops are considered. However, larger amount of leaves with mines indicates a probable reduction of the photosynthetic area which results in losses in the production and quality of the bulbs due to the smaller amount of photoassimilates (Guimarães et al., 2005).

This report confirms the occurrence and damage of *Liriomyza* spp. on *A. sativum* in Brazil. Additionally, this pest now needs to be incorporated into Brazilian garlic pest monitoring programs.

Table 1. Average± standard error of leaf number with live mines and larvae, bulb weight and Pearson correlation in four garlic cultivars Rio Paranaíba, MG. Brazil, 2018.

Cultivar (area)	Plants (n)	Leaves with mines	Active mines (live larvae) leaves^{-1}	[1]Bulb weight (g bulb^{-1})	Correlation
Ito (60 ha)	600	8.5±1.4	15.9±2.6	30.5	-0.78*
Chonan (20 ha)	200	3.7±0.2	3.1±0.2	38.4	-0.84*
RPC (35 ha)	350	5.9±3.1	6.4±0.5	37.8	-0.64*
Gravatá (12)	120	3.4±1.6	4.6±0.7	42.3	-0.21^{ns}

ns= not significant. The asterisk (*) significant demonstrates (P<0.05). RPC = cultivar roxo pérola de caçador; [1]Sampled with 135 days aflter the emergence.

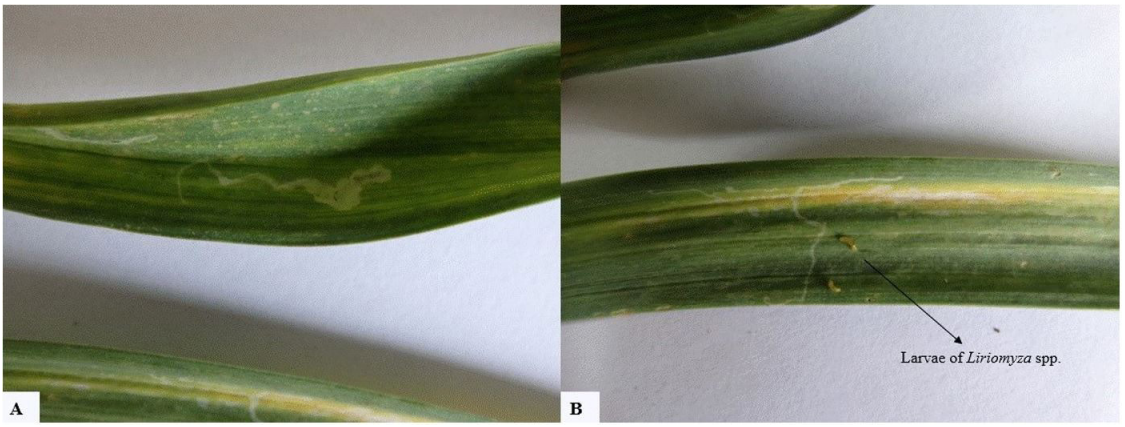

Figure 1. Average± standard error and injuries of leaf miners of *Liriomyza* spp. on leaves of *Allium sativum* L. with (A) mine serpentine (B) vermiform larvae on the leaf surface to buff.

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