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First record of Olive Pyralid Moth, *Euzophera pinguis* (Haworth, 1811) on olive trees in Lebanon (Lepidoptera, Pyralidae)

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Abstract. – Olive tree, *Olea europaea* L., is one of the oldest and the most important cultivated tree in Lebanon. However, olive production is affected by several pests and diseases, mainly the olive fruit fly *Bactrocera oleae* (Gmelin) and the peacock spot caused by the ascomycetous fungus *Spilocaea oleagina* (Castagne) S. Hughes. In September 2015, swelling and cracking of olive tree barks were observed in the region of Hasbaya and West Bekaa. Examination of infected trees showed larvae of Olive Pyralid Moth *Euzophera pinguis* (Haworth) burrowing into bark and branches. The survey conducted in these two regions shows that this pest is well established in Hasbaya, while no other infection is reported in West Bekaa. *E. pinguis* is a new invasive pest on olive trees in Lebanon and the potential risk to disseminate to other areas of olive production is very high.

Résumé. – **Premier signalement de la Pyrale des troncs de l'olivier, *Euzophera pinguis* (Haworth, 1811) au Liban (Lepidoptera, Pyralidae)**. L'oléiculture est l'une des cultures les plus anciennes et la plus importante au Liban. Cependant, la production des olives est menacée par plusieurs ravageurs et maladies, principalement la Mouche de l'olive *Bactrocera oleae* (Gmelin) et l'Œil de paon, maladie provoquée par le champignon Ascomycète *Spilocaea oleagina* (Castagne) S. Hughes, causant des pertes économiques très importantes. En septembre 2015, un nouveau ravageur, *Euzophera pinguis* (Haworth), la Pyrale des troncs de l'olivier, a été détecté pour la première fois dans les régions de Hasbaya et de Bekaa-Ouest. Les chenilles de ce ravageur invasif ont creusé des galeries dans l'écorce des troncs et des branches entraînant le dépérissement des arbres infectés. La surveillance effectuée dans ces deux régions a montré que l'insecte est bien installé à Hasbaya alors qu'aucune nouvelle infestation est signalée à Bekaa-Ouest. *E. pinguis* est un nouveau ravageur pour les oliveraies libanaises et le risque potentiel d'extension à d'autres régions est très élevé.

Keywords. – Olive pest, swelling, cracking, olive trunk necrosis, Middle East.

Olive (*Olea europaea* L.) is one of the most important crops in Lebanon. The Mediterranean climate characterised by mild to cool winters and warm dry summers, and the calcareous soil type, are very suitable for growing olives. The cultivated area with olives is estimated by 58 800 hectares which constitute 20 to 22 % of the total cultivated area and the quantity of production is approximately 113 700 tons (FAOSTAT, 2014). Olive groves are distributed along the coastal area and the mountain regions reaching about 1300 m of altitude (Zarzour, 2012). Most of the olive groves are rainfed in Lebanon. The largest area of production is located in North Lebanon (40 % of the total area) mainly in the region of Batroun, Koura, Zgharta and Akkar, followed by Nabatieh (22 % of the total area) mainly in the region of Hasbaya (IDAL, Investment Development Authority of Lebanon, 2014; FAO/RNE, 2010). The minor areas are Bekaa, South and Mount Lebanon (IDAL, 2014). About 10 varieties are growing in Lebanon, mainly Soury, Baladi and Ayrouni (FAO/RNE, 2010) and 70 % of the production is destined for olive oil, while the remaining is used as table olives (IDAL, 2014). Around 16 % of olive orchards are less than 10 years old and 36 % are more than 50 years old (IDAL, 2014). However,

Lebanese olive groves are also characterized by the presence of several centennial trees of high value, among which the Sisters Olive Trees of Noah in the village of Bshaale in the North (Chalak *et al*., 2014).

The most serious and widely distributed insects affecting the Lebanese olive groves are the olive fruit fly *Bactrocera oleae* (Gmelin, 1790) (Diptera, Tephritidae), the olive moth *Prays oleae* (Bernard, 1788) (Lepidoptera, Yponomeutidae) and both the black scale *Saissetia oleae* (Olivier, 1791) and the hemispherical scale *S. coffeae* (Walker, 1852) (Homoptera, Coccidae) causing major economic losses (MOA & LARI, Ministry of Agriculture & Lebanese Agricultural Research Institute, 2008). Other minor insects affecting olive groves with low level of damages are the leopard moth *Zeuzera pyrina* (Linnaeus, 1761) (Lepidoptera, Cossidae), the olive psyllid *Euphyllura olivine* (Costa, 1839) (Homoptera, Aphalaridae), the weevil *Otiorhynchus cribricollis* Gyllenhal, 1834 (Coleoptera, Curculionidae), the olive bark beetle *Phloeotribus scarabaeoides* (Bernard, 1788) (Coleoptera, Curculionidae), the jasmin moth *Palpita unionalis* (Hübner, 1796) (Lepidoptera, Pyralidae), the armored scales (Homoptera, Diaspididea) such as the olive scale *Parlatoria oleae* (Colvee, 1880), the oleander scale *Aspidiotus nerii* Bouché, 1833, and the California red scale *Aonidiella aurantii* (Maskell, 1879), the olive bark midge *Resseliella oleisuga* (Targioni-Tozzetti, 1887) and the olive leaf gall midge *Dasineura oleae* (Angelini, 1831) (Diptera, Cecidomyiidae) (MOA & LARI, 2008). On the other hand, the most dangerous diseases affecting olive trees in Lebanon are the peacock eye induced by *Spilocaea oleagina* (Castagne) S. Hughes (Pleosporales, Venturiaceae) and the verticillium wilt caused by *Verticillium dahlia* Kleb. (Hypocreales, Incertae sedis) (Habib *et al*., 2015; MOA & LARI, 2008). In addition, the olive knot disease caused by the bacteria *Pseudomonas syringae* pv. *savastanoi* (Smith) Young *et al.* (Pseudomonadales, Pseudomonadaceae) is recently occurring in several orchards (Choueiri, unpublished data).

Fig. 1. – Symptom of injuries on olive bark caused by *Euzophera pinguis* (Haworth). *(Photo by Elia Choueiri).*

Observations in Lebanon. – In September 2015, galls and cracking symptoms were observed for the first time on barks and branches of olive trees cultivated in the village of Hasbaya at 1100 m of altitude in Hasbaya District. The damages were extremely severe: swelling on trunks, branches and twigs; cracking and peeling of barks with extensive internal necrosis; and galleries with large amount of frass with silk fibres indicating feeding of an insect (fig. 1). Dried branches and some cases of death of whole olive trees were also reported. In the same time, the symptoms were also observed in two olive groves in the village of Kherbet Kanafar at West Bekaa District. Inspection of infected trees showed the presence of pale green larvae of about 17-18 mm length under the bark. Cocoons were collected and reared in the Department of olive and olive oil at LARI. After emergence of the adults, the moths were sent to the Department of Agricultural and Forestry Sciences and Resources at the

University of Cordoba in Spain where they were identified as *Euzophera pinguis* (Haworth, 1811) (Lepidoptera, Pyralidae), the olive pyralid moth. In October of the year, a survey was conducted in Hasbaya and West Bekaa Districts to study the distribution area of *E. pinguis*. Forty-two olive groves cultivated in Hasbaya and fifteen olive groves cultivated in West Bekaa were visited. Branches and trunks were checked on five trees randomly selected on each site. Results showed similar symptoms of infection in five sites in Hasbaya District; however, no new area of infection was reported in West Bekaa.

Some recalls about **Euzophera pinguis**. – *E. pinguis* is limited to the Oleaceae host plants, mainly on *Olea europaea* L. and *Fraxinus excelsior* L. (Sbitri & Serafini, 2007; DBIF, DataBase of Insect and their Food Plants, 2015). According to FAO/RNE (2010), *E. pinguis* can cause significant damages to olive tree where the tunnels dug by the larvae block the circulation of sap and decline the vegetative growth and dries the branches. A high infection may lead to the death of the tree (FAO/RNE (2010)). Infection was reported also on almond tree *Prunus dulcis* (Mill.) D. A. Webb (Rosaceae) in Bulgaria in 1969 (Ivanov, 1974). Other minor host is the quince *Cydonia oblonga* Mill. (Rosaceae) (CABI, Centre for Agricultural Bioscience International, 2010). The area of distribution of the olive pyralid moth is restricted to Europe and the Mediterranean region (Sbitri & Serafini, 2007) where the insect is recorded in Tunisia (Mussche *et al.*, 1987), Bulgaria (Ivanov, 1974), Spain (Duran *et al*., 1998), Denmark (Sbitri & Serafini, 2007) and United Kingdom (Kimber, 2015). Specimens are also recorded from Norway, Italy, Germany, Sweden, Belgium, Estonia, Slovakia, Finland, Luxemburg, France, Austria and Netherland (GBIF, Global Biodiversity Information Facility, 2014). Now this species is recorded for the first time in Lebanon.

Conclusion

This study showed that *Euzophera pinguis* is well established in the region of Hasbaya. The detection of the infection on olive trees in the region of Kherbet Kanafar which is located approximately at 30 km from the first source of infection indicates that the risk of spreading of this new invading pest through infected plants material is very high in the country. In addition, Lebanon imports plants mainly from Italy followed by Spain and Greece where the pest is recorded. Considering the high risk of introduction and dissemination of the olive pyralid moth in Lebanon and the severe damages that can cause to olive trees, *E. pinguis* becomes a great concern in the Lebanese olive groves.

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