

***Blastodacna libanotica* Diakonoff, 1939 – a pest on pear in Turkey (Agonoxenidae)**

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Abstract. *Blastodacna libanotica* Diakonoff, 1939 (Agonoxenidae) is recorded for the first time to damage pear trees (*Pyrus* sp.) during the larval stage. The observation has been made in Oltu, district of Erzurum province (Turkey). The larvae make galls in the young shoots. Small trees do not survive heavy infestation with this pest. The biology is discussed and the external characters of the moth and the male and female genitalia, as well as the immature stages, are illustrated.

Key words. *Blastodacna*, Agonoxenidae, life history, taxonomy, pest species, *Pyrus*, Turkey, Palaearctic.

Introduction

Moths (Lepidoptera) can have an enormous impact on agriculture, forestry and stored products. Many species can cause severe damage to fruit and crops. For example, in the family Tineidae, the larvae of the clothes moths *Trichophaga tapetzella* (Linnaeus, 1758) and *Tineola bisselliella* (Hummel, 1823) are well known to feed indoors on manufactured goods of animal origin such as wool and hair. In the family Oecophoridae the larvae of *Hofmannophila pseudospretella* (Stainton, 1849) and *Endrosis sarcitrella* (Linnaeus, 1758) feed on dead animal and vegetable matter, and can be harmful to stored products and museum collections. In the Pyralidae the species of *Ephestia* Guenée, 1845 and *Cadra* Walker, 1864 are notorious for the damage to stored products; and several other species of the subfamily Phycitinae can be harmful to fruit and coniferous trees (Baker 1983). However, the largest group of species that can influence our way of life belong to the Tortricidae. More than 400 species of this family attack crops and fruit or cause severe damage to deciduous and coniferous trees (van der Geest & Evenhuis 1991). In the rather small family Agonoxenidae, *Haplochrois theae* (Kusnetsov, 1915) is a serious pest of the tea plant. The genus *Blastodacna* Wocke, 1876 belongs to the same family, and *Blastodacna atra* (Haworth, 1828) has been reported as a pest on apple (*Malus* sp.) (Miles 1930; Balachowsky 1934). The larvae of *Blastodacna*, from the few species of which the immature stages have been described, live in twigs or fruits of woody Rosaceae. Pupation takes place in a cocoon in the feeding place or in crevices of the bark of the food plant. The genus has a Holarctic distribution, but most species have been described from the Palaearctic region. Here we report for the first time damage caused by a second species of that genus, *B. libanotica* Diakonoff, 1939 on pear and wild pear.



Figs. 1–2. Habitat of *Blastodacna libanotica* (photos H. Özbek). **1.** Turkey: Province of Erzurum near Oltu. **2.** Habitat in detail showing wild pear trees.

Material and Methods

Galls caused by *B. libanotica* were first found in August 2001 on the twigs of wild pear (*Pyrus elaeagrifolia*) on a roadside 4 km west of Oltu, in the province of Erzurum, Turkey (Figs. 1, 2). The city of Oltu is located near a tributary of the Coruh River. The observations were made along a narrow valley, starting from an altitude of 2000 m and descending to 700 m over a distance of more than 100 km. Pear plantations can be found in this valley from the Black Sea coast up to 1400 m altitude. Although wild pear trees are abundant up to 2200 m, infested trees were only found up to 1600 m; trees higher up than this showed no infestation. Between 1000–1400 m cultivated pear trees are not very abundant, but wild pear trees are more common. Below 1000 m there are many orchards growing apple, pear and other fruit in mixed orchards. In the summer of 2003 a survey was conducted to detect the presence of this insect along the valleys of Uzundere, Tortum and Ispir which are fruit-growing areas. It was found that the trees in these locations were also infested with this pest, but the population density was very low compared with that in Oltu. Both cultivated and wild pear trees are infested, but small wild pears much more heavily so than bigger trees. The damage caused by this pest resulted in the death of several small wild pear trees.

2♀ and 4♂ of *B. libanotica* have been reared from Turkey, Erzurum, Oltu-Subatik, 1300 m, 4–12.iii.2002, leg. H. Özbek. The immature stages of this species have not been depicted before. Detailed pictures of the larvae and pupae were prepared with a SEM operated by Twan Rutten. For SEM observations, larvae and pupae were dehydrated in an ethanol series of 50%, 70%, 90% and 100% (2x), each step lasting at least 15 minutes. Samples were then critical point dried in a Bal-Tec CPD030 critical point dryer (Bal-Tec Ag, Liechtenstein). Dried samples were attached to an aluminium sample block and gold coated in an Edwards S150B sputter coater (Edwards high vacuum inc., Crawley, West Sussex, UK). Examination of the specimens and digital recordings were made in a Hitachi S4100 SEM (Hisco Europe, Ratingen, Germany) and saved as tif-files. Due to the dimensions of larvae and pupae, several recordings were required to produce overview images. The complete picture was obtained by subsequent editing in Photoshop 6.0.

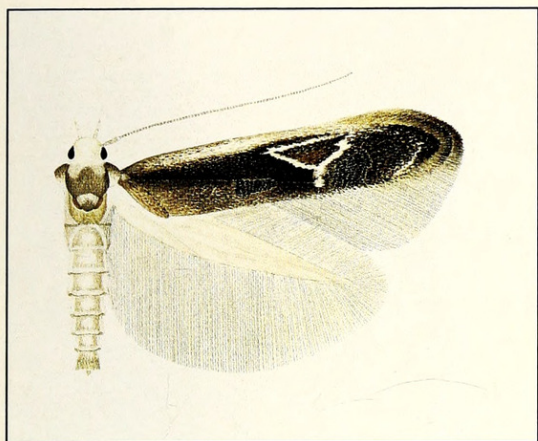


Fig. 3. *Blastodacna libanotica* Diakonoff, 1939, ♀ (watercolour J. C. Koster).

Blastodacna libanotica Diakonoff, 1939

Diagnosis. The species of the genus *Blastodacna* are small moths with a wingspan mainly of 9–15 mm, and have dark forewings with rather conspicuous tufts of raised scales. *Blastodacna libanotica* (Fig. 3) can be distinguished from the other species in Europe and adjacent areas by the rather large wingspan, 14–15 mm, and by the forewing which has a white costal streak and a white-outlined triangular mark beyond the middle. For more detailed descriptions of the adults and the male and female genitalia of *Blastodacna* species from the western Palaearctic region see Koster & Sinev (2003). From the four species of *Blastodacna* known from the eastern

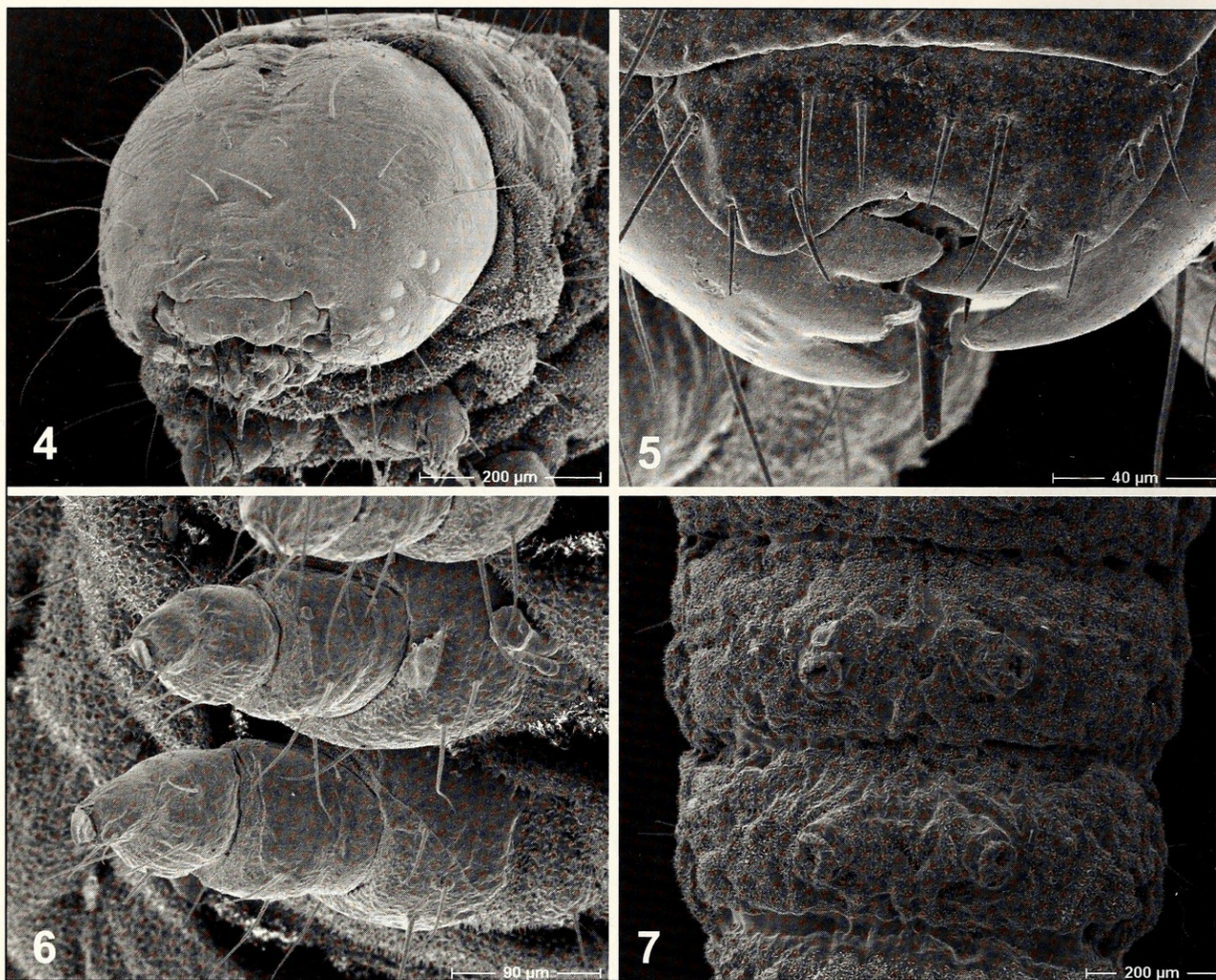
Palaearctic region, *B. pyrigalla* (Yang, 1977), known from China and Korea, is very closely related to *B. libanotica* or possibly even conspecific.

Description of immature stages. Ovum. Light brown (Talhouk 1948). This author describes the eggs as light brown, but his observation is from shrunken eggs in a rearing case which never hatched. In comparison with other species of *Blastodacna*, the eggs of *B. atra* and *B. hellerella* are translucent white, later they become opaque and yellowish, and finally brownish (Miles 1930, 1932).

Larva. Rather short and fat. Head dark brown with six conspicuous whitish ocelli on each side in an oval grouping (Fig. 4); mandibles (Fig. 5) light brown; frontoclypeus whitish. Prothoracic plate dark brown, mixed whitish and divided dorsally; anal plate small, dark brown. Thoracic legs (Fig. 6) laterally with a dark brown posterior band on each segment. Abdomen bone-white; abdominal prolegs (Fig. 7) and anal prolegs (Fig. 8) whitish, a dark brown band above both anal prolegs. Length 5.5–6.5 mm. The larvae of *B. atra* and *B. hellerella* vary from greyish white to brownish pink, are more slender and have longer setae (Miles 1930, 1932).

Pupa (Figs. 9–11). Pale brown, anterior and posterior parts darker. Length 5.5–6 mm. Wing sheaths rather short, reaching halfway along abdominal segment six. This is in contrast with *B. atra*, where the wing sheaths almost reach the end of the abdomen (Réal 1966). Ventrally on the combined ninth and tenth segment are two long leg-like protrusions at an angle of 30°–60° with the abdomen (Fig. 12). Anteriorly they are densely covered with hooked setae (Fig. 13). Cremaster absent.

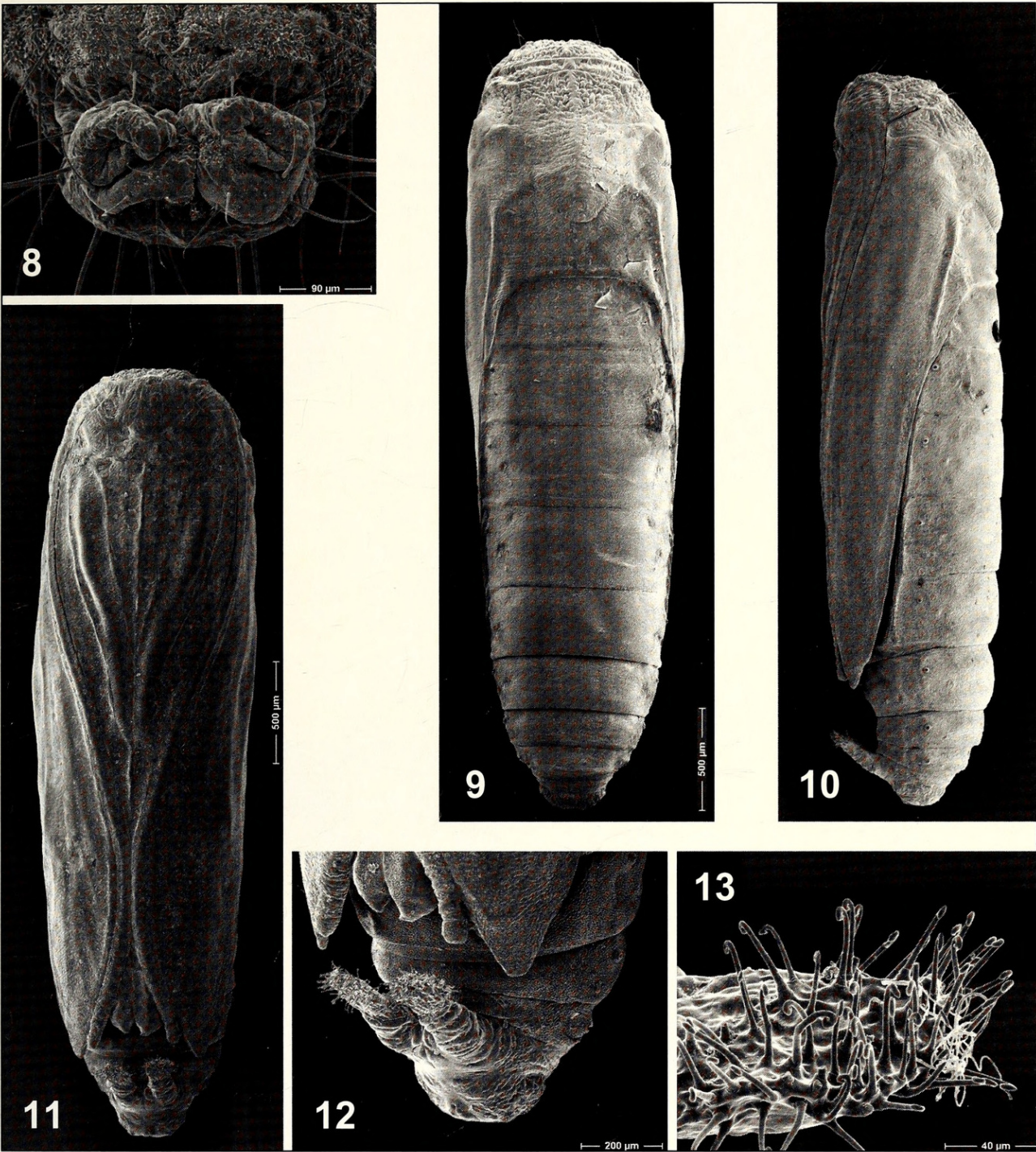
Life history. Oviposition takes place in spring. Despite several attempts, oviposition was not observed. *B. pyrigalla* lays its eggs around the base of the buds of *Pyrus* sp., and, after hatching, the young larvae move to a new twig and bore into the stem (Park 1986). The *B. libanotica* female also prefers to lay her eggs on new shoots. This was ascertained by attaching infected twigs to a small wild pear tree in early spring of 2002. A total of 33 galls were made by the larvae from those infected twigs. All but two of the galls were found in the young shoots. The remaining two were made in shoots of the previous year's growth.



Figs. 4–7. Features of the larva of *Blastodacna libanotica* Diakonoff (SEM photos by A.L.M. Rutten). **4.** Head of the larva (scale bar 200µm). **5.** Mouthparts of the larva showing the mandibles (scale bar 40 µm). **6.** Thoracic legs of the larva (scale bar 90 µm). **7.** Abdominal prolegs of the larva (scale bar 200 µm).

The larva makes a gallery in a thin twig in summer and early autumn. The gallery starts inwards at an angle of about 30° to the long axis of the twig, is then directed upward, later again in an angle of about 30° (Fig. 14). This activity causes the development of an elongate gall 11.5–13.5 mm in length and 7.3–8.6 mm in width. The gall is more or less constricted in the middle and with a rounded opening at the lower end (Fig. 15). Prior to pupation the larva enlarges the exit-hole and smoothes a circular area around its perimeter. Pupation takes place inside the gall at the end of autumn (Fig. 16).

There can be more than one gall in a twig. All exit-holes were also in the lower part of the galls, except in united galls (Fig. 17), but the polished circle around it was not always visible. From 15 July several galls were opened every two days to follow the process of the construction of the exit-holes and the stage towards pupation. On 15 July very small holes could already be observed by the extrusion of some grains of sawdust. Four days later they had been enlarged to maximum size. By 30 July all dissected galls contained larvae in the last instar, and after this date pupae were also



Figs. 8–13. Features of the pupa of *Blastodacna libanotica* Diakonoff (SEM photos by A.L.M. Rutten). **8.** Anal prolegs of the larva (scale bar 90 µm). **9.** Pupa in dorsal view (scale bar 500 µm). **10.** Pupa in lateral view (scale bar 500 µm). **11.** Pupa in ventral view (scale bar 500 µm). **12.** Leg-like protrusions at posterior end of pupa (scale bar 200 µm). **13.** Hooked setae on the leg-like protrusions with remains of silk of the cocoon (scale bar 40 µm).

found. On 10 September almost all of the dissected galls contained pupae. The larvae, as well as the pupae, were found with their heads directed towards the exit-holes. The larva constructs a cocoon in the lower part of the gallery in which the pupa hibernates. Both abdominal protrusions are firmly embedded into the silk of the cocoon, and hold the pupa in place during emergence of the adult.

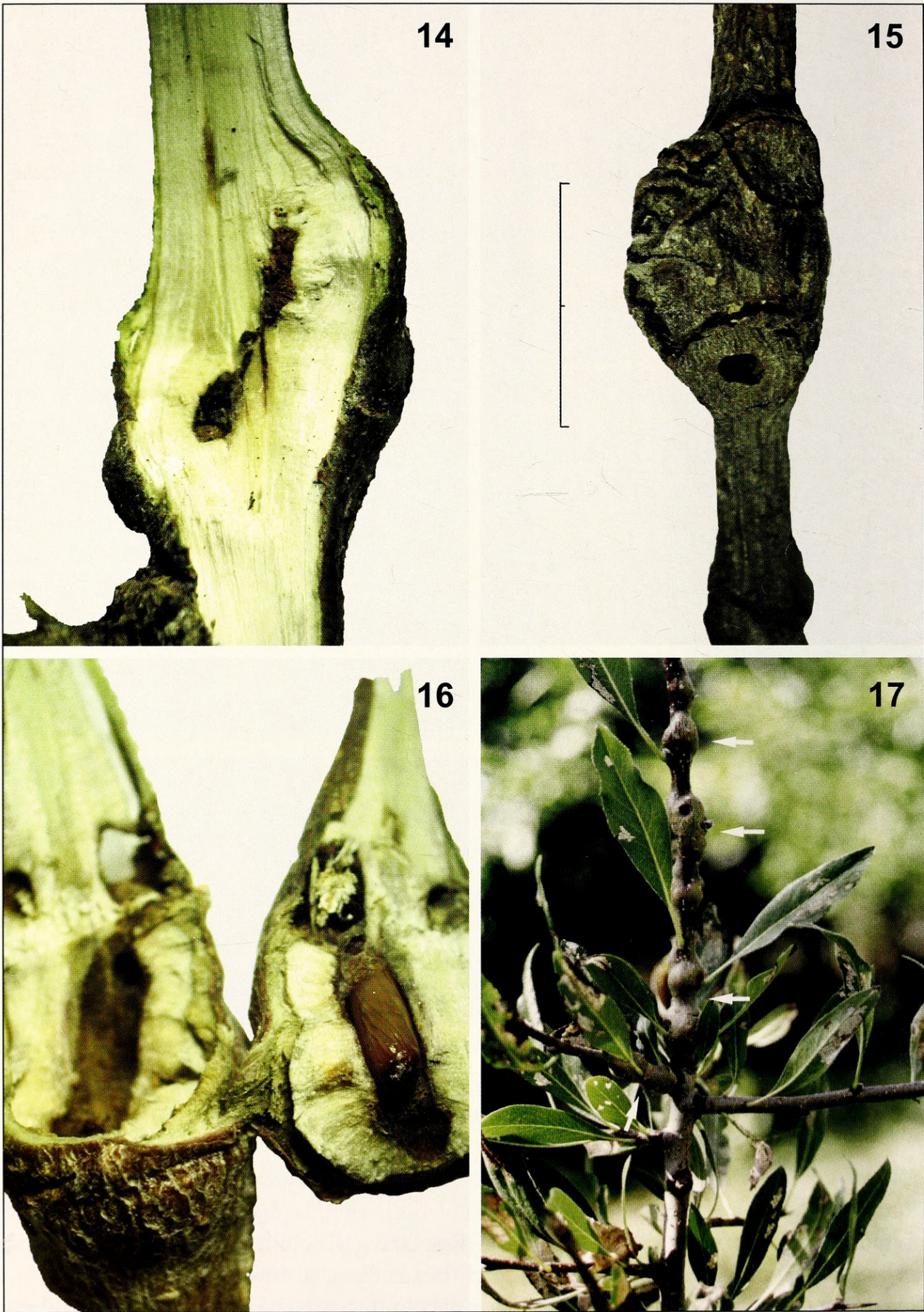


Fig. 14–17. Features of the galls of *Blastodacna libanotica* Diakonoff (photos H. Özbek). **14.** Longitudinal section of the gall with the upward part of the gallery. **15.** Gall with exit-hole (scale bar 10 mm). **16.** Longitudinal section of the gall with the pupa, its head directed toward the exit-hole. **17.** Twigs with united galls.

Adults appeared from 25 April to 10 May. In Lebanon, emergence of the adults had already started in February and lasted until May. The later appearance of adults in Turkey is possibly due to different latitude and the higher altitude.

Host plant. *Pyrus* sp. (Rosaceae), but Talhouk (1948) also reported a few galls on hawthorn (*Crataegus* sp.). The hostplant of the sibling *B. pyrigalla* is also pear, but it has also been found on peach (*Prunus persica*) and persimmon (*Diospyros kaki*, Ebenaceae) (Park 1986).

Parasites. No parasites were found in the Turkish material. Talhouk (1948) mentioned the rearing of several specimens of Pimplinae (Hymenoptera: Ichneumonidae) from distorted galls, later reported as belonging to the genus *Lissonota* Gravenhorst, 1829 (Herting & Simmonds 1975).

Distribution. *B. libanotica* has been described from specimens reared from galls on pear found in Aley, Lebanon in 1933 (Diakonoff 1939). In 1938 and following years, galls were also found in Abaydieh, Lebanon (Talhouk 1948). The first record for Turkey was made by Koster & Sinev (2003), this with reference to a female specimen from Gebse, 50 km east of Istanbul, collected by Glaser in 1969. Some authors also mention Syria, referring to the original description (Diakonoff 1939), but in those days Lebanon was a part of Syria. It is remarkable that this species on wild and cultivated pear has so far only been recorded from Lebanon and eastern Turkey. Since it occurs as a pest on economically important plants, surveys should be conducted to determine possible infestation in other parts of the country, as well as in other Middle East countries.

Conclusion. *B. libanotica* is here shown to be a pest on wild and cultivated pear trees in Turkey for the first time. It can be regarded as a minor pest in the fruit growing area along the valleys of Oltu, Uzundere, Tortum, and Ispir. However, it has been observed that wild pear trees, particularly the small ones, were more attractive than the cultivated pear trees. Heavily infested branches of some wild pear trees were completely withered, which could cause the death of small trees. It is possible that infested wild pear trees will act as a reservoir of infestation for future pear plantations in these areas. When the main shoot of cultivated trees is infested, its growth is retarded and this induces an increased development of the lateral shoots.

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