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First report of *Bucculatrix albella* Stainton, 1867 (Lepidoptera: Bucculatricidae) from Iran

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ABSTRACT. *Bucculatrix albella* Stainton is newly reported for the fauna of Iran. The species is collected in Khorasan-e Jonubi and Zanjan Provinces as larvae and cocoon, and adult, respectively. In the former Province it was found on red date, *Ziziphus jujuba* Miller (Rosales: Rhamnaceae) in some orchards of Birjand during 2015-2016. This species may be considered as a severe pest of jujube in Iran in the future.

Key words: Bucculatricidae, *Bucculatrix albella*, leaf miner, jujube, *Ziziphus jujuba*, new record, Iran

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Introduction

The family Bucculatricidae with almost 297 described species in four genera worldwide (van Nieukerken et al., 2011) is mostly represented in the Nearctic Region (Braun, 1963). Majority of its species are leaf miners in their early instars, and becoming either skeletonizers or stem borers in later instars (Friend, 1927; Braun, 1963; Davis & Robinson, 1998; Davis et al., 2002; Kobayashi et al., 2009). Most of the species are belonging to its major genus, *Bucculatrix* Zeller, 1839, which is mainly distributed in the North America and Eurasia (Mey, 1999). Their larvae are mostly feeding on members of the family Asteraceae (Braun, 1963). They are leaf miners in the first and second larval instars, quit the mine at the end of second larval instar, and spin a cocoon-shaped web on the surface of the leaf. External feeding

happens at the third and fourth larval instars on the surface of the leaf, and then skeletonizing it (Braun, 1963; Kuroko, 1964). The larvae spin an elongated, longitudinally ribbed cocoon on the leaf or branch (Kuroko, 1964, 1982). This shape of cocoon is one of the best characters and also apomorphy for this genus (van Nieukerken et al., 2012).

So far six species namely, *B. ulmella*, Zeller, 1848, *B. ulmifoliae* M. Hering, 1931, *B. pomifoliella* Clemens, 1860, *B. iranica* Deschka, 1981, *B. endospiralis* Deschka, 1981 and *B. pectinella* Deschka, 1981 have been reported from Iran (Deschka, 1981; Shahrokhi et al., 1986; Abai, 1997; Maaleki et al., 2011). During the recent years the larvae and cocoon, and adults of *B. albella* Stainton was occurred in some orchards of

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Khorasan-e Jonubi and Zanjan Provinces, respectively. In the former Province it was observed on red date (jujube), *Ziziphus jujuba* Miller. This species, which may be considered as a severe pest of jujube in Iran, is newly reported for the fauna of country. A brief description of the species as well as figures of the adult, both male and female genitalia, host plant and preimaginal stages is provided.

Material and methods

The examined specimens were collected as adults using light trap (in Zanjan Province) and larvae and cocoons on *Ziziphus jujuba* trees (in Khorasan-e Jonubi Province). The collected larvae were reared in small plastic containers at room temperature. Genitalia dissections were followed that of van Nieukerken (1985) and Robinson (1976). Photographs of genitalia slides were taken using a Dino-Eye Microscope Eyepiece Camera on a Zeiss Stemi SV8 stereo-microscope.

The examined materials are either deposited in the Lepidoptera collections of the Hayk Mirzayans Insect Museum (HMIM), Iranian Research Institute of Plant Protection (IRIPP) or of the Department of Plant Protection, College of Agriculture, University of Birjand.

Results

The adult examined specimens are briefly described as follow:

Bucculatrix albella Stainton, 1867

Material examined: Iran, **Khorāsān-e Jonubi Prov.:** 1 ♂ 5 ♀♀, Birjand, Amir Ābād, 1487 m, 8.X.2016, Moodi leg.; **Zanjān Prov.:** 2 ♀♀, Zanjān, Ābbār, N 36°56'19.2", E 48.59° 32'89", 1156 m, 21.VII.2010, Ālipanāh leg.

Diagnosis: Wingspan (male, female) 5–6 mm; ground color of the forewing white with two costal streaks composed of yellowish-brown scales tinged with dark brown scales, a macula at the inner margin

beyond the middle consisted of yellowish-brown scales tinged with few dark brown scales, and dark brown marginal scales. Fringes white with a few scattered dark brown scales apically. Hindwing yellowish-gray, with paler fringes. Frons and hair tuft of the vertex white with few hairs with dark brown ends in the middle; antenna annulated with creamy-white and light brown scales alternatively; thorax and tegula white with scattered dark brown scales on the surface of the latter and a few ones on the surface of the former (Fig. 1A) (Stainton, 1867; Kuznetsov, 1956).

Male genitalia (Fig. 1B): Tegumen merged with the uncus, and bifurcated apically with several apical setae; valva relatively narrow and elongated with almost parallel margins and rounded posterior end, with two to three strong sclerotized thorns at the upper posterior corner, and a long, thin, and pointed outgrowth at the upper anterior angle, the inner surface of the valva covered with bristles; vinculum wide and rounded; phallus large, almost straight, its length somewhat exceeds the length of the valve, heavily swollen basally and narrowed apically, without cornutus (Kuznetsov, 1956).

Female genitalia (Fig. 1C): Papillae analis almost triangular, apically rounded; apophyses posteriores relatively long (Kuznetsov, 1956), slightly longer than the length of seventh abdominal segment in the examined females, without apophyses anteriores; with a relatively wide vaginal triangular plate at the middle part of the eighth abdominal sternite (Kuznetsov, 1956), and a small and rounded ostium bursae on its anterior end followed by a narrow antrum; eighth abdominal sternite with a paired lateral concavity; ductus bursae narrow and membranous throughout; corpus bursae nearly spherical, with wide crown of sclerotized cords (Kuznetsov, 1956) positioned obliquely at the posterior end; ductus seminalis arising at the centre of this crown on corpus bursae.

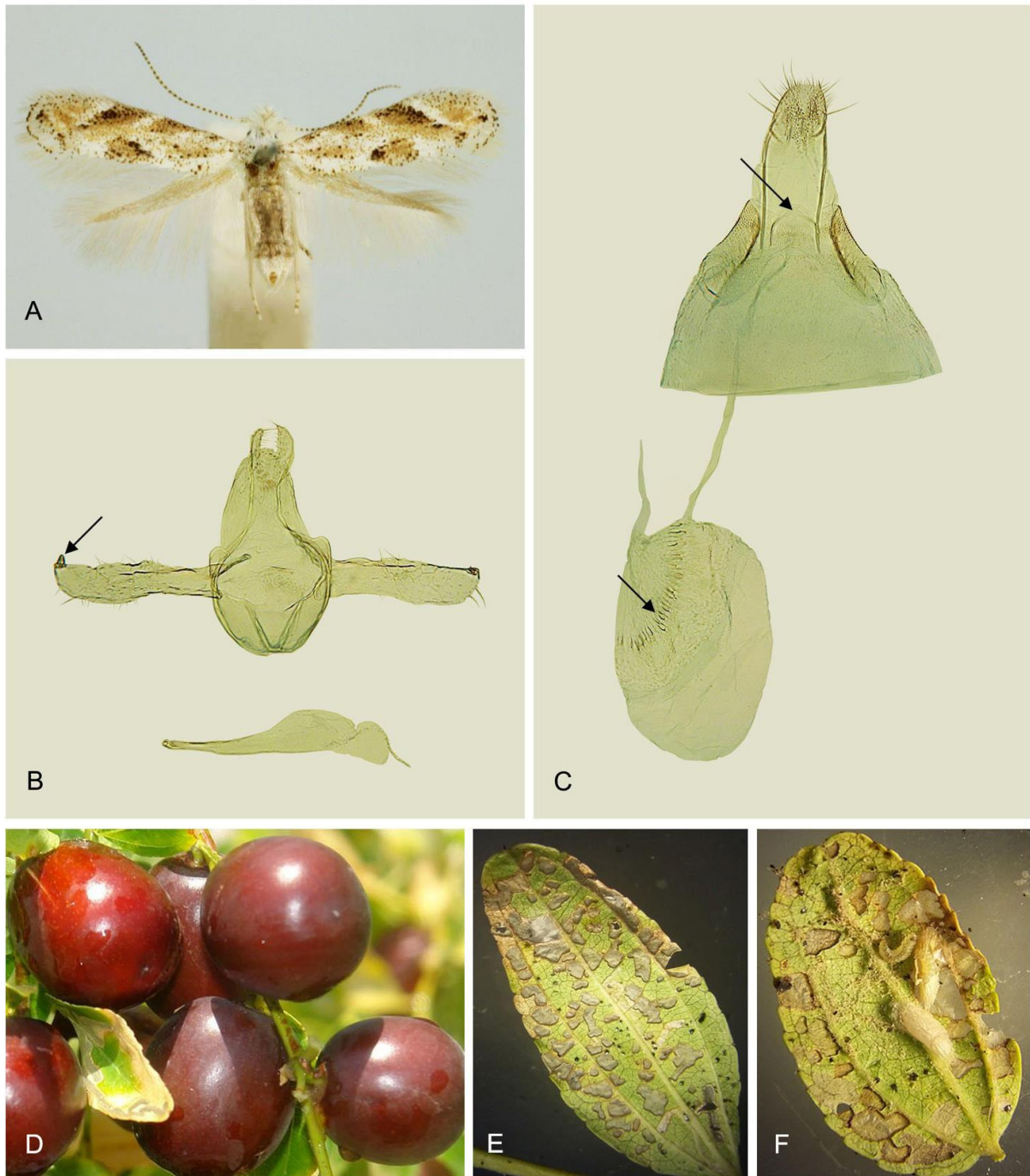


Figure 1. *Bucculatrix albella*, adult, genitalia, and damages. **A.** Adult male (after Anonymous, 2017); **B.** Male genitalia (main body and phallus in ventral and lateral views, respectively), arrow indicates sclerotized thorns at the upper posterior corner of valva; **C.** Female genitalia (main body in ventral view), upper and lower arrows indicate the vaginal triangular plate at the middle part of the eighth abdominal sternite and crown of sclerotized cords positioned posteriorly; **D.** Jujube fruit; **E.** Upperside of the damaged leaf with mines; **F.** Underside of the damaged leaf with the larva and cocoons on it.

Biology: Young larvae were observed as leaf miners on *Z. jujuba* (Fig. 1D), while the older larvae often moved out of the mines and dispersed via ballooning from one stem to another one using silk cords. Grown larvae left the mine and skeletonized the leaf. Mines were observed on the under surface of the leaf (Fig. 1E), spot-like with a membranous cover, and sometimes in corner of the veins. The pupae were formed on leaves or branches inside the elliptical cocoons (Fig. 1F), and hibernation occurred as pupae. The moth has several generations per year (Kuznetsov, 1956). The specimens were collected as adults in the Zanjan province and host plant is unknown in this area.

Distribution: This species is widely distributed in the southern Palaearctic Region from the Mediterranean area to Turkmenistan and now in Iran (Stainton, 1867; Kuznetsov, 1956; Tokár, personal information)

Discussion

This species is described by Stainton (1867) based on one male and one female collected in Jordan. Few specimens of this species have also been collected by the second author in some orchards of Khosf and Behdan (Khorasan-e Jonubi Province). According to Zdenko Tokár (pers. communication) there are additional collecting data of *B. albella* come from Iran. As stated by him, there are two specimens of this species deposited in the Vienna Museum examined by Gerfried Deschka: 1) S-Iran, 8. Km. E. Bandar Abbas, 8.IV.1972, 1 male, Gp. 1189 Deschka, 6666 Mus. Vind., Exped. Mus. Vind., det. Deschka 1979, coll. NHMW (Naturhistorisches Museum, Wien); 2) S-Iran, 8. km. E. Bandar Abbas, 11.IV.1972, 1 male, Gp. 1453 Deschka, 6667 Mus. Vind., Exped. Mus. Vind., det. Deschka 1979, coll. NHMW.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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گزارش گونه *Bucculatrix albella* Stainton, 1867 (Lepidoptera: Bucculatricidae) برای اولین بار از ایران

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چکیده: گونه *Bucculatrix albella* Stainton به عنوان گزارش جدید از ایران معرفی می شود. این گونه در استان خراسان جنوبی به صورت لارو و پیله و در استان زنجان به صورت حشره کامل جمع آوری شده است. نمونه های متعلق به این گونه در فاصله سال های ۱۳۹۴ تا ۱۳۹۵، در برخی از باغات بیرجند (استان خراسان جنوبی) از روی عنب، *Ziziphus jujuba* Miller (Rosales: Rhamnaceae) جمع آوری شده اند. این احتمال وجود دارد که گونه مزبور در آینده به عنوان آفت جدی عنب در کشور در نظر گرفته شود.

واژگان کلیدی: *Bucculatricidae*, *Bucculatrix albella*, مینوز، عنب، *Ziziphus jujuba* گزارش جدید، ایران