

# A New Sawfly Pest, *Monocellicampa pruni* Wei (Hymenoptera, Tenthredinidae) Attacking Fruitlets of Japanese Plum in South Korea

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## 자두 과실을 가해하는 새로운 잎벌류 해충, *Monocellicampa pruni* Wei (벌목, 잎벌과) 보고

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**ABSTRACT:** A larval attack leading to severe loss to fruit production of Japanese plum (*Prunus salicina* Lindl.) was reported in the orchards in Gwangyang, Jeonnam province, South Korea during the spring seasons of 2018 and 2019. As the result of investigation, the damage was identified to be caused by *Monocellicampa pruni* Wei of the family Tenthredinidae. In this study, we present the first report of this pest in Korea and describe the damage caused by the larvae as well as taxonomic information by illustrating the characteristics of male genitalia.

**Key words:** Japanese plum, *Monocellicampa pruni*, Nematinae, New pest, Symphyta

**초 록:** 2018년과 2019년 봄철에 전남 광양의 일부 자두(*Prunus salicina* Lindl.) 과수원에서 어린 과실을 낙과시켜 심각한 피해를 일으키는 새로운 해충을 채집하여 사육한 후 우화한 성충을 분류동정한 결과, 국내미기록종인 자두수염잎벌(신칭; *Monocellicampa pruni* Wei)로 확인되어 보고한다. 또한 이 해충의 피해 상황과 분류학적 특징을 기재함과 동시에 수컷생식기의 특징을 도해하여 제시하였다.

**검색어:** 자두, 자두수염잎벌, 수염잎벌아과, 새로운 해충, 잎벌아목

Genus *Monocellicampa* Wei, 1998, a small group of sub-family Nematinae, was established for *M. pruni* Wei. This genus which was hitherto known only from China contains two species: *Monocellicampa pruni* Wei, 1998 and *M. yangae* Wei, 2017 (Taeger et al., 2018). The general morphology of *Monocellicampa* is very similar to that of *Hoplocampa* Hartig, 1837, but it can be easily distinguished by following characters: clypeus deeply emarginated; mandible symmetrically tridentate; cell M in hind wing open; claws simple; ovipositor sheath much

shorter than hind femur; penis valve with distinct subapical spine. Both are associated with the fruits of *Prunus salicina* (Rosaceae) (Liu et al., 2017).

As a result of an investigation on the larvae attacking fruits of Japanese plum (*Prunus salicina* Lindl.) that caused serious damage in the orchards in Gwangyang, Jeonnam Province in South Korea during the spring seasons in 2018–2019, *Monocellicampa pruni* Wei of the family Tenthredinidae was identified. In this study, *Monocellicampa* was first recognized from Korea with one species, *M. pruni* Wei. This discovery extended the distribution of the genus *Monocellicampa*, which was previously known for a Chinese endemic genus. Also, its

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Received September 17 2019; Revised November 7 2019

Accepted November 20 2019

larval damage symptoms, diagnosis, and photographs including male genitalia are given.

## Materials and Methods

On May 9, 2018, we received a report of insect pest damage on a Japanese plum orchard located in Singeum-ri, Okgok-myeon, Gwangyang, Jeonnam Province, and visited that site for investigation and diagnosis. Two insect-proof nets and three white sticky traps were placed on the ground under Japanese plum trees canopy of the orchard in the following year (April 4, 2019). Five sawfly adults (all males) trapped in the net were identified.

All examined specimens used in this study were deposited to the Yeungnam University, Gyeongsan, South Korea (YNU) and Suncheon National University, Suncheon, South Korea (SCNU). The morphological terminology followed Viitasaari (2002) and name of the mentioned host plant gained from 'The Plant List' (<http://www.theplantlist.org/>).

For genitalia preparation, the male specimen was placed in a moist chamber for one day. The genital capsule was pulled out with an insect pin, and the attached tissues were dissolved in 10% KOH for 30–40 minutes in boiling water. The penis valve was dissected from the male genital capsule. After dissection, they were glued to a piece of cardboard (Glue Boards, 10 mm × 20 mm, BioQuip Products Inc., USA). The genital preparation was studied and photographed using an optical microscope, and then attached to the pin of the specimen.

Observations of the adults were made with a Stemi 2000 stereomicroscope (Carl Zeiss, Germany). The images of the adults were captured with an AxioCam HRC camera through a SteREO Discovery V20 stereomicroscope (Carl Zeiss) and were produced with AxioVision40AC software (Carl Zeiss). Male penis valve was photographed with an IMT cam CCD5 PLUS camera mounted on a BX53F microscope (Olympus, Japan) and was produced with IMT iSolution Lite, version 22.1, software. Composite images were created from stacks of images using AxioVision40AC (Carl Zeiss) and IMT iSolution Lite software (Vancouver, BC, Canada), and final plates were prepared using Adobe Photoshop CS6 software (Adobe Systems Incorporated, San Jose, USA).

The following abbreviations were used throughout the text:

OOL, the distance between the compound eye and outer edge of lateral ocellus; POL, the shortest distance between medial margins of the two lateral ocelli.

## Systematic accounts

**Family Tenthredinidae Latreille, 1803** 잎벌과

**Subfamily Nematinae Thomson, 1871** 수염잎벌아과

**Genus *Monocellicampa* Wei, 1998** 자두수염잎벌속(신칭)

***Monocellicampa pruni* Wei, 1998** 자두수염잎벌(신칭)

*Monocellicampa pruni* Wei, 1998: 16.

**Diagnosis.** FEMALE (Liu et al., 2017; Figs. 13, 15–21). Body length of 5.8–6.3 mm. Body black, except mandible brown at middle; antenna and cercus dark brown; legs dark brown, except fore femur mostly, middle and hind femora dorsally yellowish-brown. Length of postocellar area much shorter than width, OOL: POL = 1: 1.2–1.3. Distance between cenchri almost equal to maximal width of a cenchrus. Vein Sc in fore wing meeting directly or slightly extending beyond end of vein M; vein R+M as long as vein Rs+M; anal cell in hind wing with long petiolate, its length 1.1–1.3 times as long as vein cu-a. Lancet with about 15 serrulae; each serrula subtriangularly protruding basally, with 7–9 distal denticles.

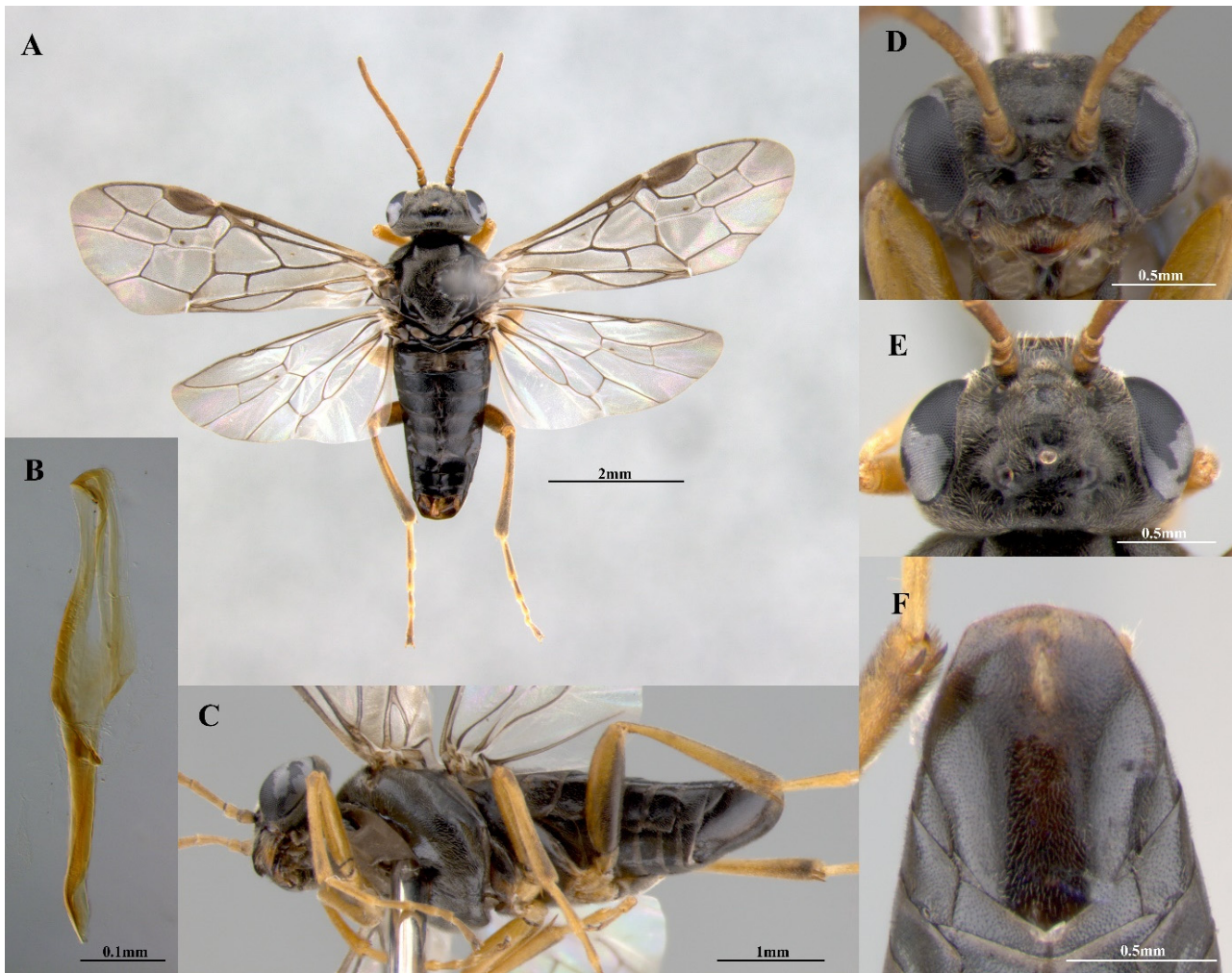
MALE (Fig. 1). Body length 4.4–4.8 mm. Similar to female, but antenna entirely yellowish brown; legs much brighter than female (largely yellowish brown) (Fig. 1A, C, D). Posterior margin of sternum 9 almost truncated (sometimes weakly convex at middle) (Fig. 1F). Penis valve as in Fig. 1B, valviceps almost equal in length to valvura.

**Specimens examined.** SOUTH KOREA: 4♂♂, Jeollanam-do, Gwangyang-si, Okgok-myeon, Singeum-ri, 6.IV.2019, K.J. Hong leg. (YNU & SCNU); 1♂, same locality, 7.IV.2019, K.J. Hong leg. (YNU).

**Host plant.** Rosaceae: *Prunus salicina* Lindl. (Liu et al., 2017).

**Distribution.** South Korea (new record), China (Anhui, Beijing, Chongqing, Hebei, Henan, Jiangsu, Shaanxi, Shandong, Shanxi, Sichuan, Zhejiang) (Liu et al., 2017).

**Remark.** The female was not collected in Korea, so the description was extracted from several publications (Wei, 1998; Liu et al., 2017).



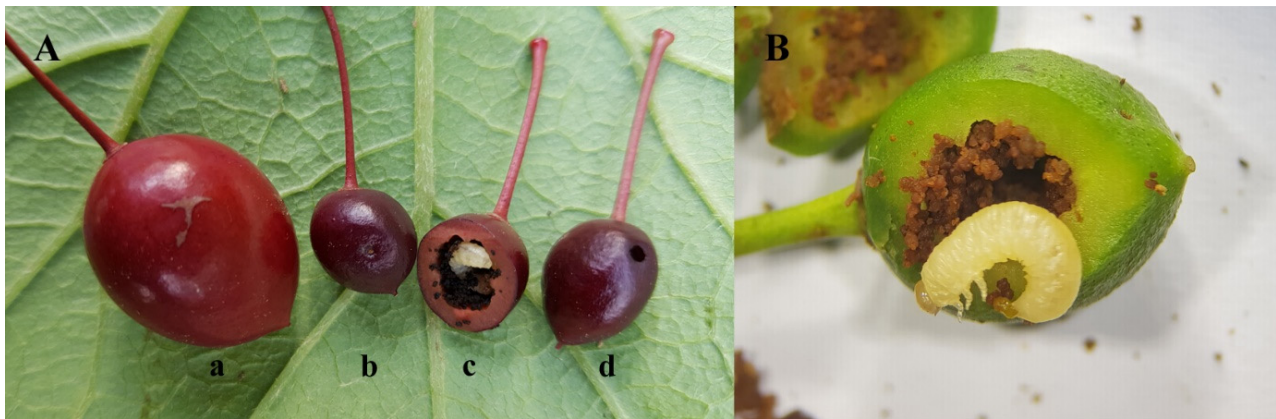
**Fig. 1.** *Monocellicampa pruni* Wei, male: A. habitus in dorsal view; B. penis valve; C. habitus in lateral view; D. head in frontal view; E. head in dorsal view; F. sternum 9.

## Discussion

Until now, the infestation of sawfly on fruit crops in Korea has only been known for the species attacking pear fruitlet, *Hoplocampa coreana* Takeuchi (Muramatus, 1929). The new sawfly pest that fed exclusively within Japanese plum fruitlet in early spring was identified as *Monocellicampa pruni* Wei in this study. According to our field observation, adults started emerging from the soil early April at the blooming stage of Japanese plum. We could not observe where their eggs were laid but could confirm the oviposition sign on the surface from the young fruitlet (Fig. 2A-b). The larvae fed on the flesh and to consume the seeds of the developing Japanese plum fruitlet (Fig. 2A-c). Larvae are cream to yellowish grey, with a darker

head. At mature, they measure 6–7 mm long (Fig. 2B). One larva feeds and develops within only a fruitlet. Once fully mature (early and mid May), the larvae exit from fruitlet (Fig. 2A-d), drop to the ground, and burrow into the soil where they probably remain until the following spring before pupating and emerging as adults. There is one generation per year. That orchard or tree injury was so severe that the farmer could not harvest at all for the two years we observed (Fig. 3).

*M. pruni* Wei was first reported in 1998 in many provinces of China. At present, it is hard to determine whether the pest is an indigenous species to Korea or invasive alien species from China. In addition to the observed Japanese plum orchard in Okgok-myeon Gwangyang, the damage symptoms were also identified in another Japanese plum orchard with no pesticide



**Fig. 2.** Damage to Japanese plum fruit caused by *Monocellicampa pruni* Wei: A-a. normal fruit; A-b. oviposition sign on fruitlet; A-c. infested fruitlet; A-d. larval exit hole. B. fully mature larva after feeding within a fruitlet (photos taken on May 9, 2018).



**Fig. 3.** Damage to Japanese plum trees caused by *Monocellicampa pruni* Wei: A. infested fruits with exit hole; B. compared infested fruits to normal fruits; C. nearly no fruit set due to severe damage (photos taken on May 9, 2018).

application located in Bongang-myeon Gwangyang. Therefore, monitoring for this sawfly pest in other regions including Gwangyang and more detailed life cycle are required.

## Acknowledgments

This work was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) (NIBR201902205) and was carried out through “Survey and identification of insect pests of small area-cultivated crops in southern areas of Korean peninsula”

(Project Code PJ01450704) supported by Rural Development Administration, South Korea.

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