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The First Records of *Pemphigus bursarius* (Linnaeus, 1758) (Hemiptera: Aphididae: Eriosomatinae) from South Korea

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한국의 미기록종 *Pemphigus bursarius* (Linnaeus, 1758) (노린재목: 진딧물과: 면충아과)에 대한 보고

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ABSTRACT: In this study, the gall-forming aphid species, *Pemphigus bursarius* (Linnaeus, 1758) is reported for the first time in Korea. Species description, measurement, diagnosis, distributions, host plants, illustrations, and identification key of fundatrix are provided.

Key words: *Pemphigus bursarius*, Eriosomatinae, *Populus nigra* var. *italica*, Korea

초 록: 본 연구에서 *Pemphigus bursarius*를 국내에서 처음으로 보고한다. 이 종의 분포지역, 기주식물, 형태학적 정보를 제공한다.

검색어: 양버들면충(신칭), 면충아과, 양버들, 한국

The genus *Pemphigus* Hartig, 1839 includes 73 species in the world (Blackman and Eastop, 2022). This genus is mostly distributed in the Holarctic and Oriental regions (Furk and Prior, 1976). Most species are known to be holocyclic heteroecious between *Populus* spp. as its primary hosts and its secondary hosts such as Brassicaceae, Compositae/Asteraceae, Euphorbiaceae, Leguminosae/Fabaceae, and Ranunculaceae. All species of this genus are known to make galls on leaves or twigs of *Populus* spp. (Blackman and Eastop, 2022).

In Korea, a total of two species have been recorded in this genus: *Pemphigus dorocola* Matsumura, 1917 and *Pemphigus matsumurai* Monzen, 1927 were recorded by Saito, 1931. In 2022, Several galls of *Pemphigus bursarius* (Linnaeus, 1758) was collected on *Populus* nigra var. italica in Korea. In this study, we report fundatrix of *Pemphigus bursarius* for the first time in Korea.

Materials and Methods

Samples were preserved in 95% ethanol and then mounted Canada balsam, following the method of Blackman and Eastop (2000) methods. Images and measurements were taken by LEICA (DM3000 LED) and LEICA (CTR6 LED). All specimens were deposited Institute of Agriculture & Life Science, Gyeongsang National University. The following abbreviations are used in morphological features: BL - body length from the head to the end of cauda; Ant.I-VI - antennal segments, respectively; Ant.VIb - antennal segment base of VI; PT -

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processus terminalis; URS - Ultimate rostrum segment; 1HT - first tarsal segment of hind leg; 2HT - second tarsal segment of hind leg; HTB - hind tibia; GP - genital plate; ABDT - Abdominal tergite; SIPH - Sipuncula; Co - Costa; Cu - Cubitus; M - Media; Pt - Pterostigma; Rs - Radial sector. Abbreviations were used for the region: GG, Gyeonggi-do.

Taxonomic Accounts

***Pemphigus bursarius* (Linnaeus, 1758)** 양버들면충(신칭) (Table 1; Figs. 1-2)

Aphis bursaria Linnaeus, 1758: 458

Description. Fundatrix. Morphology. Head and thorax dark grey; Body oval, 2.212-2.459 mm long; Head weakly sclerotized; Ant. brown, usually 4-segmented, Whole Ant, 0.132-0.139 times as long as BL; Ant.III longer than IV; Ant.I, Ant.II with 2 setae, Ant.III with 1-3 setae, Ant.IV with 1-4 setae; Ant.III, Ant.IV with short projecting primary rhinarium, with an undeveloped PT; Rostrum not reaching the middle Furmorotrochanter, URS light brown with 4 accessory setae 0.094-0.101 mm long, 0.040-0.043 times as long as BL, 0.746-0.833 times as long as 2HT; Hind coxa 0.116-0.150 mm long, Hind femorotrochanter 0.427-0.505 mm long, width 0.108-0.144 mm long; Tarsus separated to 2-segment, 1HT 0.041-0.079 mm long, 2HT 0.118-0.130 mm long, Hind claws 0.051-0.053 mm

Table 1. The biometric data of the Fundatrix of *P. bursarius* in Korea

	Body parts	Fundatrix (n=11)
		Mean (range)
Length (mm)	Body	2.320(2.212-2.459)
	Ant.	0.309(0.276-0.333)
	Ant.I	0.054(0.051-0.058)
	Ant.II	0.051(0.048-0.058)
	Ant.III	0.112(0.100-0.119)
	Ant.IV	0.098(0.090-0.104)
	HTB	0.380(0.358-0.398)
	1HT	0.050(0.041-0.079)
	2HT	0.123(0.118-0.130)
	Claws	0.052(0.051-0.055)
	URS	0.097(0.094-0.101)
No. of setae on	Ant.I	2(1-3)
	Ant.II	1(1-2)
	Ant.III	1(0-4)
	Ant.IV	5(2-5)
	1HT	2(1-2)
	2HT	11(10-11)
	URS	4(4-6)
	GP	18(16-21)
	Cauda	10(9-11)
Ratio	Ant. / BL	0.133(0.117-0.139)
	URS / BL	0.042(0.039-0.043)
	URS / 2HT	0.790(0.746-0.833)

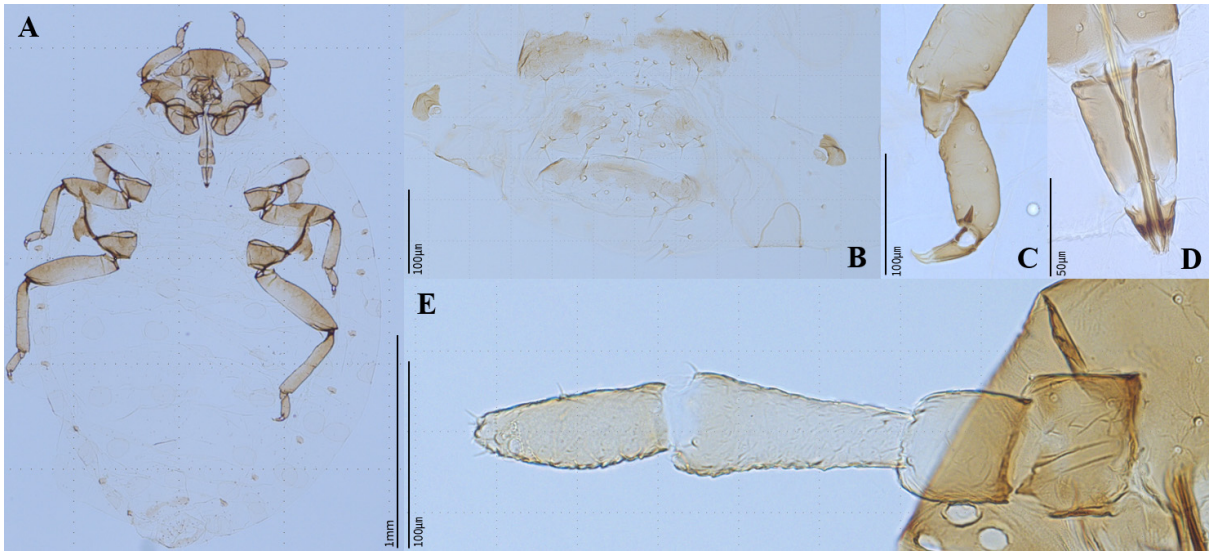

Fig. 1. Fundatrix of *Pemphigus bursarius* (A, whole body; B, GP and Cauda.; C, hind tarsus; D, URS; E, Ant.).

Fig. 2. Galls induced by *Pemphgius bursarius* on *Populus nigra* var. *italica*.

long, Femora becoming dusky brown at apex, all tarsus brownish; Wax gland plate present on abdomen; SIPH absent; GP sclerotized with a total of 16-21 setae; Anal plate with 19-27 setae; Cauda weakly sclerotized, light brown with 10 setae.

Materials examined. 11 Fundatrices, Gapyeong, GG, South Korea, 14.v.2022, Coll#HB-67 on *Populus nigra* var. *italica*, H. Lee, GNU

Host plants. *Populus nigra* var. *italica*, *Populus deltoides*, *Populus* spp. (Salicaceae), *Quercus* sp. (Fagaceae), *Cichorium intybus*, *Lapsana communis*, *Lactuca sativa*, *Sonchus* spp., *Taraxacum officinale*, *Tussilago farfara* (Asteraceae) (Blackman and Eastop, 2022; Kollár, 2007; Furk and Prior,1976; Miller et al., 2005).

Distributions. Korea (new record), South Africa, Azerbaijan, India, Japan, Austria, Belgium, Estonia, France, Germany, Italy, Sardinia, Netherlands, Romania, Slovakia, Switzerland, United Kingdom, Canada, Australia, New Zealand (Aoki, 1975; Ili and Marinescu, 2018; Kollár, 2007. Hałaj and Osiadacz, 2013).

Remark. Galls on *Populus* spp. (most commonly *Populus nigra* var. *italica*) are yellowish or reddish when mature, purse-shaped, always formed on leaf petioles.

Key to Species of the Genus *Pemphigus* in Korea

1. URS not reaching middle coxae, URS length less than 0.115 (0.100-0.120) ····· *P. dorocola*
- URS reaching middle coxae ····· 2
2. URS not reaching hind coxae, URS length 0.132 (0.115-0.143) ····· *P. matsumurai*
- URS not reaching hind coxae, URS length less than 0.115 (0.094-0.101) ····· *P. bursarius*

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Statements for Authorship Position & Contribution

Lee, H.: Gyeongsang National University, Student in Ph.D; Designed the research, wrote the manuscript and examined specimens

Lee, W.: Gyeongsang National University, Professor, Ph.D; Examined specimens and designed the research

All authors read and approved the manuscript.

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