

***Glyphina betulae* (Hemiptera, Aphididae, Thelaxinae) New to the Far Eastern Asia from Mt. Baekdusan, North Korea**

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ABSTRACT

An aphid species, *Glyphina betulae* (Linnaeus, 1758), which has been known only in western Palearctic, is recognized from Mt. Baekdu-san, North Korea. Besides the descriptions and illustration for apterous viviparous female and alate viviparous female, brief biology, host plants and distribution are discussed. This is the first record of the genus *Glyphina* in Korean Peninsula.

Key words: Hemiptera, Aphididae, Thelaxinae, *Glyphina betulae*, North Korea

INTRODUCTION

Glyphina is a small genus with five species; three in Europe and Asia and two in North America. Three Palearctic species are monoecious holocyclic on the leaf or fresh shoot of birch and alder, whereas the Nearctic two species are subterranean on the root of *Betula* spp. (Blackman and Eastop, 1994; Richards, 1968).

Morphologically, this genus is closely related to the genus *Thelaxes* Westwood, 1840 but distinguished by following characters: stout peg like hairs and the wart like ornamentation on the dorsal surface of head, thorax and abdomen; siphunculi low and truncate; cauda semicircular; first tarsal segments with 5-5-5 hairs; body rather small elongated-oval shape; short 5-segmented antennae with very short process terminalis (PT); and complete fusion of trochanter and femur.

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In the Far Eastern Asia, only one species, *Glyphina pseudoshrankiana* Blackman, has been reported by Blackman (1989) in Japan.

Examining the North Korean specimens deposited in the Institute of Entomology, Czech Academy of Sciences, which had been collected by the Czech Expeditions in 1988, we found several samples of *Glyphina betulae* (Linne, 1758) from Mt. Baekdu-san, the highest mountain in Korean Peninsula. Up to now, this species has been reported only in Europe.

Abbreviations used in this paper are as follows: Ant.I, II, III, IV, Vb, antennal segment I, II, III, IV, Vb, and the base of Ant.V, respectively; PT, processus terminalis; URS, ultimate rostral segment; 2HT, second segment of hind tarsus; SIPH, siphunculus.

Materials used in this paper are deposited in the National Institute of Agricultural Science and Technology (NIAST), Suwon, Korea and the Institute of Entomology, Czech Academy of Sciences, Ceske Budejovice, Czech Republic.

SYSTEMATIC ACCOUNTS

Family Aphididae 진딧물과

Subfamily Thelaxinae 납작진딧물아과

Genus *Glyphina* Koch, 1856 털납작진딧물속 (신칭)

Type species: *Aphis betulae* Linnaeus, 1758

***Glyphinae betulae* (Linnaeus, 1758) 털납작진딧물 (신칭) (Fig. 1, Table 1)**

Aphis betulae Linnaeus, 1758: 452.

Thelaxes betulina Buckton, 1866.

Aphis impingens Walker, 1852.

Glyphina betulae: Heie, 1980: 97; G. Remaudière & M. Remaudière, 1997: 260.

Material examined. 7 apterous viviparous females, Samjiyon, Mt. Baekdu-san Region, North Korea, 15. June 1988, leg. Jan Havelka, on *Betula platyphylla* Sukatschev (Betulaceae) (Coll.# 88HA3055). 23 apterous viviparous females, 7 alate viviparous females, Samjiyon, Mt. Baekdu-san Region, North Korea, 25. June 1988, leg. Jan Havelka, on *Betula mandshurica* Nakai (Betulaceae) (Coll.# 88HA3166; 88HA3179, 88HA3182).

Description. Apterous viviparous female. *Colour (alive)*: Dark green with a pale longitudinal line dorsally. *Colour (macerated specimens)*: Head, thorax and abdomen, including siphunculi and cauda dark brown with a spinal longitudinal pale line from pronotum to tergite VII. Intersegmental joint pale except tergite III-tetgite VI forming one dark pigmented plate. Antennae and legs darker than body with Ant.III and tibiae paler than other segments (Fig. 1, A).

Morphology: Body elongate oval, 1.55-2.03 mm long (Table. 1). **Head**: adorned dorsally with many small warts, or strongly denticulated with 8 acuminate hairs dorsally, longest one two times as long as the basal width of Ant.III. Eye consisting of triommatidium. Antennae 5 segmented, 1/3 as long as body length; Ant.I and Ant.II rather smooth, sparsely spinulated with 2-5 and 2-3 hairs respectively; Ant.III-Ant.V strongly and densely spinulated, bearing 13-17 acuminate hairs on Ant.III, longest one 1.7 times as long as the basal width of the segment; primary rhinaria on Ant.IV

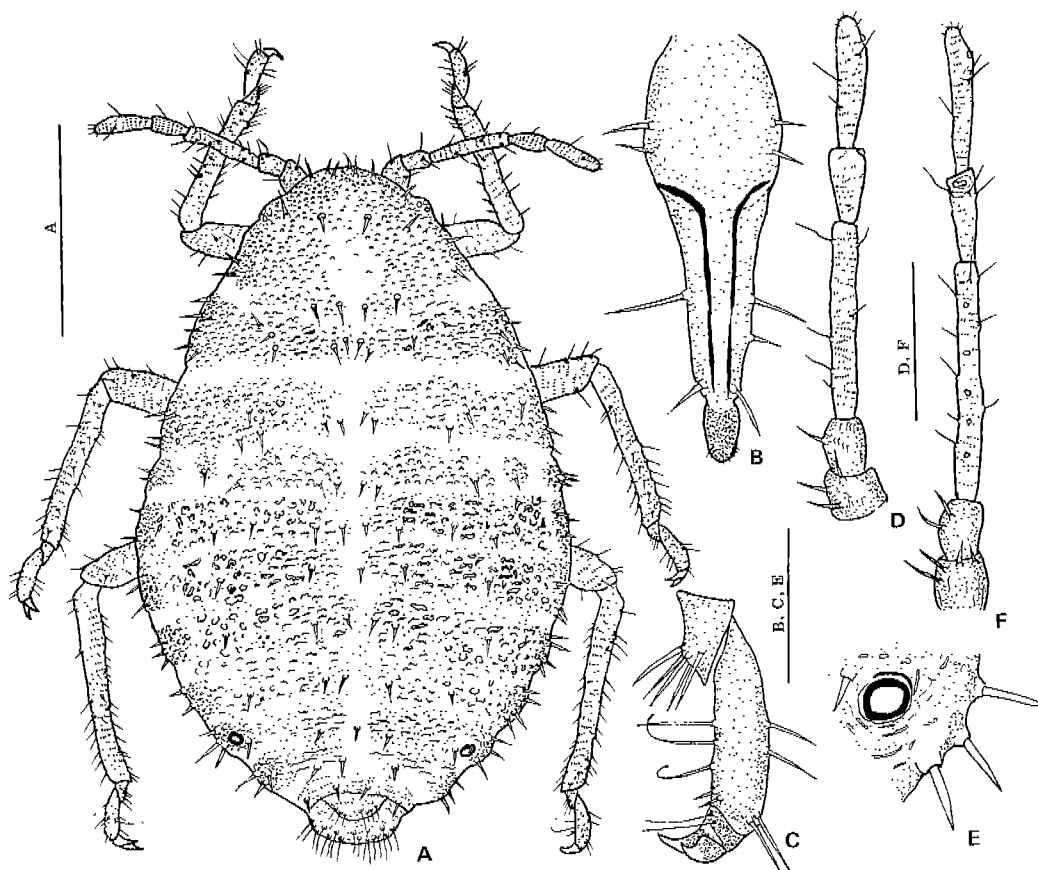


Fig. 1. *Glyphina betulae* (Linnaeus, 1758) (A-E, apterous female; F, alate female). A, habitus (dorsal); B, ultimate rostral segment (URS); C, hind tarsus; D, antennal segment I-V (Ant.I-Ant.V); E, siphunculi and marginal sclerite of tergite VI. Scale bars equal 0.5 mm (A), 0.1 mm (B, C, E), and 0.2 mm (D, F).

and Ant.V protrudent; distal end of Ant.IV more than 2 times as wide as the basal width of the segment; the base of Ant.V 6 times as long as PT, 0.91 times as long as 2HT (Fig. 1, D). Rostrum attaining the anterior margin of the hind coxal cavity; clypeus with 2 hairs in the middle, mandibular laminae with 1 hair on each side; URS 1.2 times as long as 2HT with 3-4 secondary hairs (usually 1 pair long and 1 pair short), 1.5-2 times as long as the primary apical 2 hairs (Fig. 1, B). **Thorax:** adorned dorsally with many small warts, or strongly denticulate with 4 spinal hairs on pronotum; hind coxae spinulated with 5-7 short hairs, the longest hair shorter than the basal width of the hind femur; trochanter and femur fused completely, femur spinulated with 25 hairs, longest one slightly shorter than the basal width of the segment with 2 pseudorhinaria at base; tibia sparsely spinulated with 36 hairs, longest one slightly longer than the basal width of the segment, and 2-3 pseudosensoria on distal part of mesotibia; first tarsal chaetotaxy 3:3:3. Second hind tarsus (2HT) with 3-5 dorsal and 5 ventral hairs (Fig. 1, C). **Abdomen:** dorsum adorned with distinct warts, mostly horizontal irregular winkle, forming rather irregular circle pleurally (Fig. 1, A).

Table 1. Biometric data of *Glyphina betulae* from Mt. Baekdu-san, North Korea.

Part		Apterous vivipara (n = 11)			Alate vivipara (n = 10)		
		Min.	Max.	Avr.	Min.	Max.	Avr.
Length of (in mm)	body from antennal tubercle to cauda	1.55	2.03	1.81	1.44	1.94	1.73
	whole antennae	0.50	0.67	0.59	0.62	0.78	0.70
	antennal segment III (Ant.III)	0.190	0.260	0.236	0.256	0.320	0.292
	antennal segment IV (Ant.IV)	0.085	0.110	0.093	0.095	0.140	0.121
	antennal segment V base (Ant.Vb)	0.090	0.130	0.119	0.110	0.155	0.143
	processus terminalis (PT)	0.015	0.025	0.021	0.020	0.035	0.027
	ultimate rostral segment (URS)	0.160	0.183	0.171	0.155	0.180	0.169
	hind tibia	0.50	0.58	0.54	0.63	0.74	0.67
	hind femur	0.40	0.48	0.44	0.44	0.52	0.48
	hind tarsus II (2HT)	0.130	0.150	0.141	0.129	0.155	0.141
	hairs on Ant.III	0.045	0.060	0.050	0.045	0.060	0.054
	hairs on abdominal tergite III	0.038	0.045	0.041	0.055	0.070	0.062
	hairs on abdominal tergite V	0.040	0.050	0.048	0.058	0.065	0.062
Ratio	URS/2HT	1.09	1.35	1.21	1.03	1.31	1.19
	URS/Vb	1.23	1.88	1.44	1.00	1.36	1.17
	Vb/PT	4.50	8.33	5.68	4.00	6.65	5.49
No. of hairs on	antennal segment I (Ant.I)	2	5	3.2	3	5	3.9
	antennal segment II (Ant.II)	2	3	2.1	2	2	2
	antennal segment III (Ant.III)	6	10	7.9	11	15	12.1
	URS	3	4	3.7	3	4	3.8
	tergite III	13	17	15	15	20	17
	tergite VI between SIPH	2	5	3.3	3	5	4
	tergite VIII	3	5	4.1	4	4	4
cauda	6	7	6.1	6	9	6.8	
No. of rhinaria on	Ant.III	0	0	0	4	6	5.3

Tergite III, tergite VI between SIPH and tergite VIII with 13-17, 2-5 and 3-5 peg like hairs, respectively, longest one distinctly shorter (0.7x) than the basal width of hind femur (Table. 1). Siphunculus very short, poriform (Fig. 1, E). Cauda broadly round and strongly spinulated with 6 hairs. Genital plate strongly spinulated with ca. 26 hairs.

Alate viviparous female. *Colour (macerated specimen)*: paler than apterae, except head, mesothorax and the antennal segment I-II dark brown. Abdomen pale with dark pigmentation at the base of dorsal setae, and large circular sclerite at the base of pleural setae together on each segment. Some spinal 4 setae sharing an irregular horizontal sclerite. Tergite VII, anal plate and genital plate including cauda pale brown. *Morphology*. Head weakly spinulated; eye well developed

with lateral triommatidium; antennae with 3-5, 2, 11-15 short hairs on Ant.I, Ant.II and Ant.III, bearing 4-6 secondary rhinaria scattered throughout the Ant.III (Fig. 1, F). Mesothorax adorned densely with small warts like wrinkles; hairs on abdominal tergite slender and fine in comparison with apterae, longest one as long as the basal width of the hind femur; forewing with narrow dark bordering of veins and stigma. Mesotibia with 7-8 pseudosensoria on distal half.

Distribution. Widespread in Europe (Denmark, Sweden, Norway, Finland, Great Britain, North German, Poland, Central Europe, Russia, West Siberia). Korea (new record).

Host plants. *Betula* spp. (*B. platyphylla*, *B. mandshurica*, *B. verrucosa* Ehrh., *B. pubescens* Ehrh.)

Biology. Lives on only *Betula* spp., occurring on the young shoot or underside of leaves. Ant attended. Seems to occur in rather cold regions, probably limited to high mountain of North Korea, especially in Mt. Baekdu-san. In Europe, sexual form appear rather early, in the middle of summer, August and September. Most individuals are apterous viviparous females and alate viviparous females are produced from June to August. (O. Heie, 1980).

Remarks. Korean specimens correspond well to the European *G. betulae*, except following minor difference. In apterous female: antennae short, 1/3 times as long as body length (1/2 times as long as body length in European samples); the base of Ant.V is relatively long, 6 times as long as PT (at most 4 times as long as PT in European samples); the longest hair on Ant.III long, more than 2 times as long as the basal width of the segment (usually shorter than 2 times of basal width of the segments in European samples).

The Palearctic three species, *G. betulae*, *G. schrankiana* Börner and *G. pseudoschrankiana* Blackman are rather difficult to distinguish by external morphological characteristics. According to Szelegiewicz (1982), the apterous viviparae of *G. betulae* live only on *Betula* spp., and have warty (denticulate) ornamentation of the dorsal cuticle, whereas those of *G. schrankiana* live on *Alnus* spp. but can also occur on *Betula pubescens* with a dorsal ornamentation composed of short wrinkles or incomplete reticulations.

Despite of the morphological similarity, the karyotypes of each species in this genus are different; *Glyphina schrankiana* $2n = 8$, *Glyphina pseudoschrankiana* $2n = 10$, and *Glyphina betulae* $2n = 56$ with a $2n = 28$ "chromosomal race". The further study of karyotypes are recommended and will possibly support the determination of the Korean species. For now, unfortunately, we could not get the fresh Korean sample of *G. betulae* for karyotype study. A key to the Palearctic three *Glyphina* spp. is available in Blackman (1989).

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백두산에서 채집한 극동아시아 미기록종, *Glyphina betulae*
(매미목, 진딧물과, 납작진딧물아과)의 보고

이 승 환 · Jaroslav Holman* · Jan Havelka*
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요 약

북한 백두산 지역에서 채집한 진딧물표본 중 현재까지 극동아시아지역에서 기록되지 않은 *Glyphina betulae*(Linnaeus, 1758) (털납작진딧물, 신칭)를 확인하였다. 무시성충과 유시성충의 형태 특징과 계량형질, 무시성충에 대한 외부형태의 도해 및 생활사, 기주, 분포 등을 기술하였다.