

Taxonomy of the Genus *Indomegoura* (Hemiptera, Aphididae) in Korea

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ABSTRACT

Two species of the genus *Indomegoura* Hille Ris Lambers (Hemiptera: Aphididae) are recognized in Korea, including *I. nigrotibiae* (Tao, 1963) new to Korean Peninsula. Besides the descriptions, the host plants and the key to the species of genus *Indomegoura* are provided and the biology of each species are discussed.

Key words: Hemiptera, Aphididae, *Indomegoura*, Korea, host plant, biology

INTRODUCTION

Indomegoura Hille Ris Lambers, 1958 is a small genus in the subfamily Aphidinae (Hemiptera: Aphididae) with three species reported only from Eastern Palaearctic region (Japan, Taiwan, Korea and China) and India. It is characterized by the large and orange yellow body covered with white wax powder, stout and dark siphunculi reticulated distally, and their association with *Staphylea* spp (Staphyleaceae) and *Hemerocallis* spp (Liliaceae).

Since Hille Ris Lambers (in MacGillivray, 1958) established this genus based on a single species, *Ingomegoura indica* (van der Goot), Tao (1963) described another new genus *Omeimegoura* based on *Omeimegoura nigrotibiae*. Thereafter, Miyazaki (1971) suppressed the genus *Omeimegoura* as a synonym of *Indomegoura*. Recently, G.-x. Zhang *et al.* (1992) described *I. regiosetaca* G.-x Zhang from China. In Korea, only one species, *I. indica*, has been reported up to now by Paik (1965).

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It has been known that the type species of this genus, *Indomegoura indica*, migrate from the primary host, *Staphylea bumalda* De Candolle or *Euscaphis japonica* (Thunb.) Kanitz (Staphyleaceae) to the secondary host, *Hemerocallis* spp. (Liliaceae) (Blackman, 2000). The second species, *I. nigrotibiae* (Tao, 1963) has been also reported to live on *Staphylea bumalda* from China (Szechuan) and Japan.

As a result of examining aphid specimens collected by author during the last 3 years, two species of the genus *Indomegoura* are recognized, among which *I. nigrotibiae* is new to Korean fauna. Besides the description, host plants and the biology of each species are discussed.

Abbreviations used in this paper as follows: Ant. I, II, III, IV, V, VIb, antennal segment I, II, III, IV, V, and the base of Ant. VI, respectively; PT, processus terminalis; URS, ultimate rostral segment; 2HT, second segment of hind tarsus; SIPH, siphunculus; apt., apterous viviparous female, apterae; al., alate viviparous female, alate; ov., oviparous female, oviparae; ny., nymph; N., North; S., South.

Materials used in this paper are deposited in the National Institute of Agricultural Science and Technology (NIAST), Suwon, Korea.

SYSTEMATIC ACCOUNTS

Subfamily Aphidinae 진딧물아과

Tribe Macrosiphini 수염진딧물족

Genus *Indomegoura* Hille Ris Lambers, 1958 인도불록진딧물속
(= *Omeimegoura* Tao, 1963)

Type species. *Indomegoura indica* (van der Goot, 1916) (*Rhopalosiphum*)

Key to the species of the genus *Indomegoura* in Korea

(based on apterous viviparous female).

1. Body small, 2.50-2.87 mm long in apterae. Cauda triangular, short as long as the basal width without constriction. Antennal tubercle smooth with one hair. Antennal segment III without secondary rhinaria. SIPH barrel-shaped, slightly swollen in the middle. URS 0.9-1.0 as long as 2HT. *I. nigrotibiae*
- Body large, 3.50-4.80 mm long in apterae. Cauda elongated, slightly constricted in the middle. Antennal tubercle weakly spinulated with 3 hairs. Antennal segment III with 1-12 secondary rhinaria. SIPH cylindrical at base, strongly attenuated at apical reticulated area. URS 0.7-0.8 as long as 2HT. *I. indica*

1. *Indomegoura nigrotibiae* (Tao, 1963) 꼬마불록진딧물 (신칭) (Fig. 1)

Omeimegoura nigrotibiae Tao, 1963: 184.

Indomegoura nigrotibiae: Miyazaki, 1971: 44.

Material examined. 10 apt., 3 ny., Songhyun-ri, Wonsan-myon, Gangneung, Gangwon-do, 13. Aug. 1999, on *Staphylea bumalda*; 3 ny., Jindong-ri, Girin-myon, Inje, Gangwon-do, 13. Aug. 1999 on *S. bumalda*.

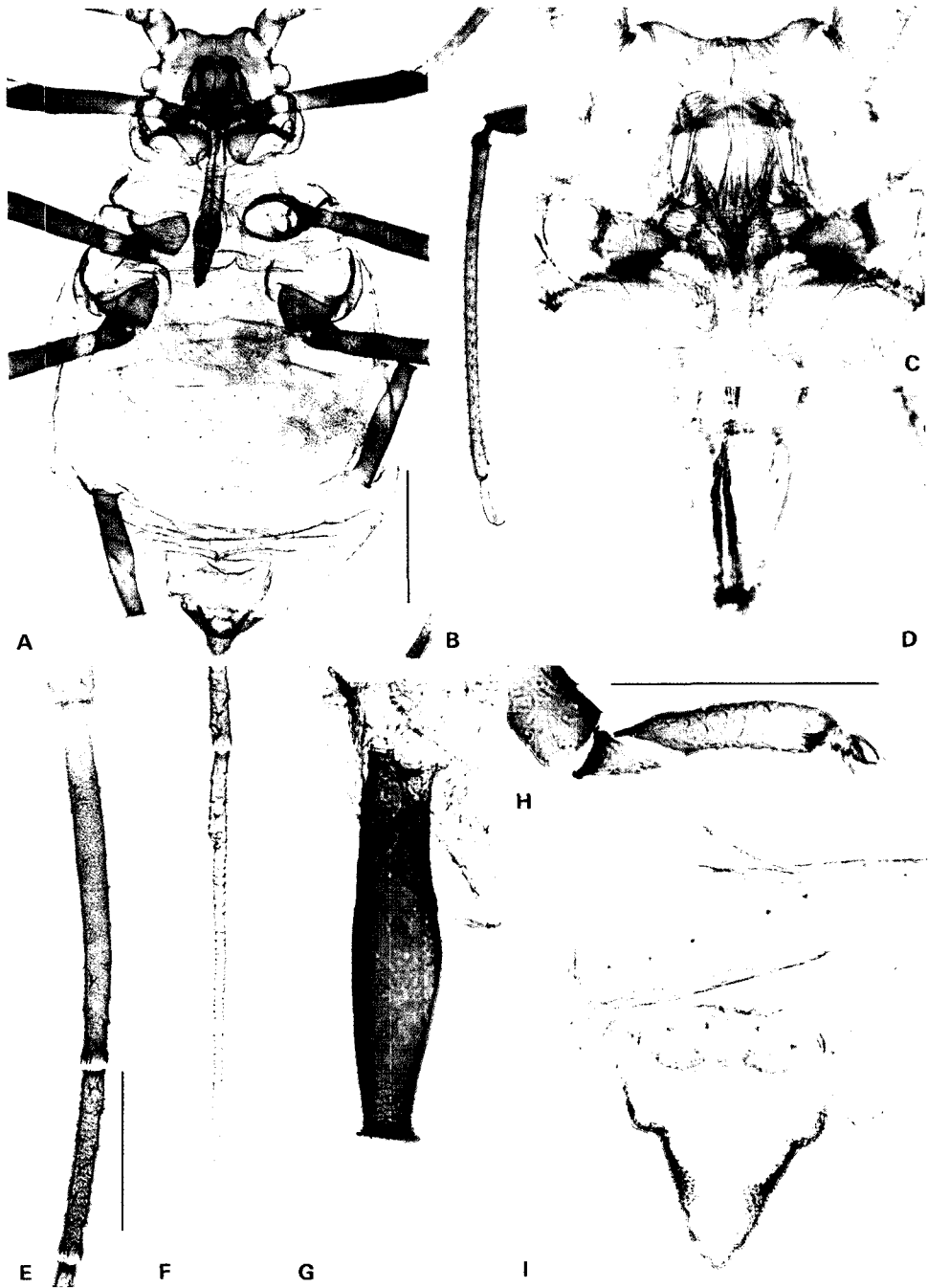


Fig. 1. Apterous viviparous female *Indomegoura nigrotibiae* (Tao, 1963). A, apterous female; B, hind tibia and tarsus; C, head and prothorax (focused on dorsal surface); D, ultimate rostral segment (URS); E, antennal segment III-IV; F, antennal segment VI (base and process terminalis); G, siphunculus (SIPH); H, hind tarsus; I, cauda and abdominal tergite VII-VIII. Scale bars equal 0.5 mm (A, B), 0.25 mm (C, E, F, G, I), and 0.2 mm (D, H).

Description. Apterous viviparous female. *Colour (alive)*: unknown. *Colour (macerated specimens)*: head dark brown; thorax and abdomen pale brown; antennae, legs dark brown except extreme pale base of femur; SIPH and cauda dark brown.

Morphology: Body oval, 2.50-2.87 mm long from the antennal tubercle to the end of cauda. Head: smooth with 5 pairs of pointed dorsal hairs, one pair on vertex ventrally, the longest hair slightly shorter than the basal width of Ant.III. Antennal tubercle weakly developed with a single hair. Antennae shorter (0.8-0.9x) than body length: I, 0.12-0.14 mm; II, 0.10-0.11; III, 0.58-0.63; IV, 0.32-0.40; V, 0.29-0.36; VIb, 0.15-0.17; PT, 0.62-0.66. Ant.I smooth with 7-8 hairs; Ant.II imbricated partly with 5 hairs; Ant.III smooth with ca. 27 fine hairs, the longest hair slightly shorter than the basal width of the segment; Ant.IV-V weakly imbricated with ca. 12 hairs; Ant.V imbricated with ca. 8 hairs, primary rhinaria ciliated, the longest diameter 1/2 as long as the middle width of the segment; VIb and PT imbricated with 3 and 7 hairs respectively, PT 4.3x as long as VIb. Rostrum attaining the anterior margin of hind coxae; clypeus with 4 hairs; mandibular lamiae with 2-3 hairs on each side; URS 0.15-0.16 mm long, wedge-shaped, 0.9x as long as 2HT, 1.2x as long as VIb with 1 or 2 pairs of short secondary hairs, the longest one 1/2 as long as the apical primary setae. Thorax: pronotum smooth with 2 spinal hairs and 1 marginal hairs anteriorly. Hind coxae spinulated with ca. 10 short hairs; trochanter clearly separated from femur, smooth with 4 hairs; femur weakly imbricated with short acuminate hairs, the longest one lesser than 1/2 of the basal width of the segment; hind tibia smooth with the longest hair slightly shorter than the middle width of the segment; first tarsal segment winkled basally with 3 hairs at apex; 2HT 0.175-0.190 mm long, imbricated with 3-5 hairs dorsally, 5-6 ventrally. Abdomen: dorsum reticulated with 15-16 short hairs on tergite III, the longest one 1/3 as long as the basal width of hind femur; tergite VI with 8-9 hairs between SIPH; tergite VIII with 7-8 hairs. SIPH smooth, 0.5-0.6 mm long, 2.5x as long as cauda, slightly swollen in the middle, weakly reticulated distally, well fringed. Cauda short, triangular, strongly spinulated with 8-10 hairs. Genital plate with 3-5 median long hairs and 8-12 short hairs on posterior margin.

Remarks. This species is similar to *Indomegoura indica*, but can be distinguished by the absence of secondary rhinaria on antennal segment III and cauda short, triangular, slightly longer than wide and much shorter than siphunculi.

Distribution. Korea (S.), Japan, China (Szechuan).

Host plants. *Staphylea bumalda*.

Biology. The type specimens (apterous viviparous female) of Tao (1963) were collected in August on unknown host in Mt. Omeisan, Szechuan, China. Miyazaki (1971) reported apterous viviparous females in July on *Staphylea bumalda* in Mt. Takao, Tokyo, Japan. So far, the host alternation of this species has not been reported. All specimens in this study have been also collected in August on *Staphylea bumalda*. It seems that this species is monoecious holocycle on *Staphylea* spp.

2. *Indomegoura indica* (van der Goot, 1916) 인도불록진딧물 (Fig. 2)

Rhopalosiphum indicum van der Goot, 1916: 1.

Rhopalosiphum miniatum Matsumura, 1918: 12.

Rhopalosiphum hemerocallidis Matsumura, 1918: 12.

Amphorophora indica: Takahashi, 1923: 87.

Nectarosiphum mitsubautsugii Shinji, 1923: 308.

Amphorophora essigwanai Mason, 1925: 29.

Amphorophora lilicola Shinji, 1933.

Indomegoura indica: Hille Ris Lambers in MacGillivray, 1958: 25; Paik, 1965: 71.

Material examined. 5 apt., 33 ny., Crop Exp. Sta., Suwon, 7. Sep. 1989, on *Hemerocallis lilioasphodelus* Linne (Liliaceae); 10 apt., Crop Exp. Sta., Suwon, 6. July 1987, on *Hemerocallis fulva* L.; 4 apt., 2 al., 5 ny., Seoul National University (Suwon campus), Suwon, 27. July 1995, on *H. fulva*; 17 al., Mungil-ri, Juam-myon, Suncheon, Jeollanam-do, 7. May 1998, on *Staphylea bumalda*; 18 al., Mt. Taehwasan, Gwangju, Gyeonggi-do, 8. May 1998, on *S. bumalda*; 24 apt., 1 al., 7 ny., Citrus Research Institute, Namwon-myon, Jeju-do, 10. June 1998, on *S. bumalda*; 1 al., Medicinal Herbs Research Station, Jinan, Jeollabuk-do, 13. May 1999, host unknown; 1 al., Jinsan-myon, Geumsan, Chungcheongnam-do, 14. May 1999, host unknown; 11 al., Gwangneung Aboretum, Pocheon, Gyeonggi-do, 21. May 1999, on *S. bumalda*; 16 al., 6 ny., Mt. Chiaksan, Wonju, Gangwon-do, 23. May 1999, on *S. bumalda*; 1 al., Mountain Vegetable Research Station, Pyeongchang, Gangwon-do, 2. June 1999, host unknown; 2 al., Sogeumgang, Jumunjin, Gangwon-do, 3. June 1999; 3 al., 2 ny., Osaek, Mt. Seoraksan, Yangyang, Gangwon-do, 4. June 1999, on *S. bumalda*; 3 ny., Medicinal Herbs Research Station, Hamyang, Gyeongsangnam-do, 7. July 1999, host unknown; 7 apt., 2 ny., Medicinal Herbs Research Station, Hamyang, Gyeongsangnam-do, 20. June 2000, on *H. fulva*.

Description. Apterous viviparous female. *Colour (alive)*: body orange, covered by white wax powder; antennae, legs and SIPH black; cauda reddish brown. *Colour (macerated specimen)*: body pale, except head, cauda and genital plate pale brown; antennae, SIPH and legs dark brown or black except coxa, trochanter and base of femur pale brown.

Morphology: Body oval, 3.50–4.80 mm long from the antennal tubercle to the end of cauda. Head: smooth with 4 pairs of blunt dorsal hairs, one more pair on vertex, the longest hair distinctly shorter than the basal width of Ant.III. Antennal tubercle developed moderately, weakly spinulated with three hairs on each side. Antennae as long as or slightly shorter than the body length: I, 0.17–0.22 mm; II, 0.12–0.14; III, 1.00–1.45; IV, 0.60–1.10; V, 0.45–0.80; VIb, 0.15–0.22; PT, 0.90–1.20. Ant.I spinulated with 11–13 hairs; Ant.II granulated with 5 hairs; Ant.III weakly spinulated with ca. 50 blunt hairs, the longest one distinctly shorter than the basal width of the segment, bearing 2–5 secondary rhinaria confined to basal 1/4; Ant.IV–V weakly imbricated with ca. 30 and ca. 18 hairs respectively with ciliate primary rhinaria, the longest diameter 1/2 as long as the middle width of Ant.V; Ant.VIb and PT imbricated with 4–7 and ca. 18 hairs respectively, PT 6 times as long as Ant.VIb. Rostrum attaining the posterior margin of mesocoxal plate; clypeus with 4 hairs; mandibular lamiae with 5–6 hairs on each side; URS 0.18–0.20 mm long, wedge-shaped with 2 pairs of secondary hairs, slightly shorter than Ant.VIb, 0.7–0.8x as long as 2HT. Thorax: pronotum smooth with 1 pair of spinal hairs anteriorly on each side. Hind coxae spinulated with ca. 16 short hairs; trochanter smooth with 5 short hairs; femur smooth but weakly spinulated on distal half with short blunt hairs, the longest one lesser than 1/3 as long as the basal width of the segment; hind tibia smooth with short hairs, longest hair 1/2 as long as the middle width of the segment; first tarsal segment with three hairs at apex; 2HT 0.22–0.27 mm long, imbricated with 5 dorsal hairs and 6 ventral hairs. Abdomen: dorsum membranous with 20–25



Fig. 2. Apterous viviparous female *Indomegoura indica* (van der Goot, 1916). A, head and thorax; B, hind tibia and tarsus; C, ultimate rostral segment (URS); D, hind tarsus; E, antennal segment I-IV; F, antennal segment V-VI; G, siphunculus (SIPH); H, cauda and abdominal tergite VIII. Scale bars equal 0.5 mm (A, B, E, F), 0.25 mm (G, H), and 0.2 mm (C, D).

short hairs including marginal ones on tergite III, the longest hairs 1/2 as long as the basal width of hind femur; tergite VI with 9-13 setae between SIPH; tergite VIII with 5-8 hairs. SIPH smooth at basal 5/6, reticulated and constricted strongly at distal 1/6. Cauda elongated with 9-13 hairs, 1/2 as long as SIPH. Genital plate with 2-3 median long hairs and 15-21 short hairs on posterior margin.

Alate viviparous female. *Colour (alive)*: Body orange with antennae, legs and siphunculi black. *Colour (macerated specimen)*: head, thorax and cauda pale brown. Otherwise like as apterous viviparous female.

Morphology: Ant. III with ca. 55 secondary rhinaria. Wings transparent with veins and stigma dark pigmented. Otherwise like as apterous viviparous female.

Distribution. Japan, Korea, China, Taiwan, India.

Host plants. *Staphylea bumalda*, *Euscaphis japonica*, *Hemerocallis* spp. (*middendorffii*, *aurantiaca*, *exaltata*) (after Blackman, 2000). *Hemerocallis fulva* (new record)

Biology. Inhabits the underside of leaves or the apical young stem of *Staphylea* spp., (specially *S. bumalda* in Korea) as a primary host and migrate to the secondary host, *Hemerocallis* spp. (specially *H. fulva* in Korea). Takahashi (1923) recorded apterous sexuparae and both apterous and alate males on the primary host plant. Very common species in Korea.

REFERENCES

- Blackman, R. L. and V. F. Eastop., 2000. Aphids on the World's crops. An Identification and Information Guide. Second Edition. The Natural History Museum, London. 466pp.
- Hille Ris Lambers, D., 1947. Contribution to a monograph of the Aphididae of Europe. III. *Temminckia* **7**: 179-319.
- MacGillivray, M. E., 1958. A study of the genus *Masonaphis* Hille Ris Lambers, 1939 (Homoptera, Aphididae). *Temminckia* **10**: 1-131.
- Miyazaki, M., 1971. A revision of the tribe Macrosiphini of Japan (Homoptera: Aphididae, Aphidinae). *Insecta Matsumurana*, **34**(1): 1-247.
- Paik, W. H., 1965. Aphids of Korea. Publishing center of Seoul National University, Seoul, Korea. 160pp.
- Remaudière, G. and M. Remaudière. 1997. Catalogue of the world's Aphididae. Homoptera Aphidoidea. Institut National de la Recherche Agronomique. 473 pp.
- Tao, C. C., 1963. Revision of Chinese Macrosiphinae (Aphidae, Homoptera). *Plant Protect. Bull. Taiwan*. **5**(3): 162-205.
- Takahashi, R., 1923. Aphididae of Formosa. Part 2. Rep. Govt. Res. Inst. Dept. Agric. Formosa **4**: 1-173.
- Zhang, G.-x., T.-s. Zhong and W.-y. Zhang, 1992. Homoptera Pemphigidae, Hormaphididae, Thelaxeridae [sic], Drepanosiphididae, Chaitophoridae, Anoeciidae, Lachnidae, Aphididae: pp. 137-175. in Peng J.W. & Liu Y.Q.: Iconography of forest insects in Hunan, China.

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한국산 인도불록진딧물속 *Indomegoura* (매미목, 진딧물과)의 분류학적 연구

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요 약

한국산 인도불록진딧물속 (*Indomegoura*)을 정리하여 2종을 확인하였으며, 이 중 꼬마불록진딧물 (*I. nigrotibiae*)을 한반도에서 처음으로 보고한다. 각 종에 대한 형태적기술과 더불어 종 검색표를 작성하고, 기주식물 및 생활사에 대하여 논하였다.