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FAR EASTERN SPECIES OF THE GENUS *ACHLYA* BILLBERG, 1820 (LEPIDOPTERA, DREPANIDAE: THYATIRINAE) WITH NOTES ON THEIR SYNONYMY

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Three species of the genus are recorded from the Russian Far East. A generic diagnosis and a key to discussed species based on external characters and genitalia structures are given. New subspecies *Achlya flavicornis sikhotensis* **subsp. n.** is described from Primorskyi krai. Two new synonyms are proposed for *Achlya longipennis* Inoue, 1972 = *Achlya longipennis tateyamai* Inoue, 1982, **syn. n.**, = *Achlya longipennis inokoi* Inoue, 1982, **syn. n.** The data on general distribution, habitats and the host plants are summarized. Male and female genitalia are illustrated and the maps with known collecting sites are provided.

KEY WORDS: Thyatirinae, *Achlya*, taxonomy, faunistic, Russian Far East.

Ю.А. Чистяков. Дальневосточные виды рода *Achlya* Billberg, 1820 (Lepidoptera, Drepanidae: Thyatirinae) с заметками об их синонимии // Дальневосточный энтомолог. 2008. N 180. С. 1-10.

Для Российского Дальнего Востока указываются 3 вида рода. Приводится диагноз и определительная таблица рассматриваемых видов, основанная на внешних признаках и строении их гениталий. Из Приморского края описан новый подвид *Achlya flavicornis sikhotensis* **subsp. n.** Предложена новая синонимия: *Achlya longipennis* Inoue, 1972 = *Achlya longipennis tateyamai* Inoue, 1982, **syn. n.**, = *Achlya longipennis inokoi* Inoue, 1982, **syn. n.** Обобщены данные

о распространении, местах обитания и кормовых растениях. Приводятся рисунки гениталий самцов и самок и карты с указанием находок рассматриваемых видов на Дальнем Востоке России.

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INTRODUCTION

The genus *Achlya* Billberg, 1820 includes four species, distributed in temperate zone of Palaearctic. *A. flavicornis* L. ranges widely throughout Eurasia from West and Central Europe to North-Eastern China, Korea and Japan (Freina & Witt, 1987). *A. kuramana* (Mats.) was known from Japan and quite recently has been found in Korea (Choi, 2007). *A. longipennis* is known from Japan and Russian Far East. *A. hoerburgeri* Schaw. is known from Russian Far East only. Due to their biological peculiarities (all of them are known as vernal species, flying in early spring) they rather rarely get through to collections and still remain to be poorly known species.

The aim of this paper is to summarize all known up to date literature data and available material on this genus in the Russian Far East fauna. In the course of this study one new subspecies was described and two new synonyms were proposed. The paper based mainly on the author's material and on the collection of the Institute of Biology and Soil Science, Russian Academy of Sciences, Vladivostok (both of those are presented in survey without special indication). Type material of newly described *A. flavicornis sikhotensis* is deposited in the Institute of Biology and Soil Science, Vladivostok. In addition few specimens of *A. flavicornis jesoensis* and *A. longipennis* from Japan were examined by author. The literature cited for every species includes only the sources based on the local material. The information for each observed species includes the basic bibliography, host plants and habitats in the local conditions and general distribution as well.

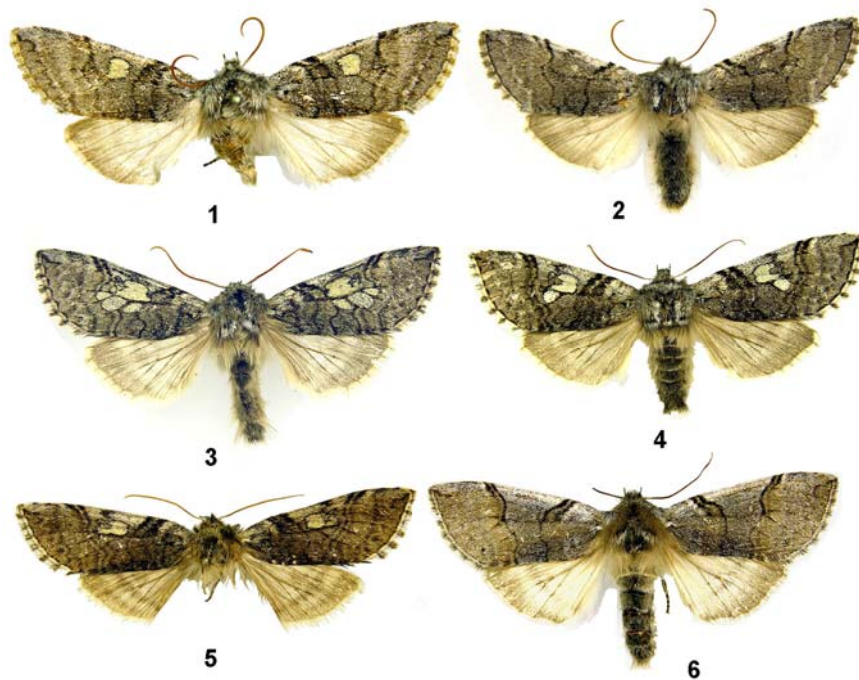
Genus *Achlya* Billberg, 1820

Achlya Billberg, 1820: 87, type species: *Phalaena flavicornis* Linnaeus, 1758, by subsequent designation by Tams, 1939: 70.

Cymatophora Treitschke, 1825: 77, type species: *Phalaena flavicornis* Linnaeus, 1758, by subsequent designation by Duponchel, 1829: 71. A junior homonym of *Cymatophora* Hübner, [1812] 1806 and a junior objective synonym of *Achlya* Billberg, 1820.

Daruma Matsumura, 1927: 15, type species *Daruma jesoensis* Matsumura, 1927, by original designation. Synonymized with *Achlya* by Inoue, 1954: 3.

DIAGNOSIS. Moths of moderate size with stout, densely haired body and elongated wings, externally somewhat similar to noctuids. Antenna lamellate. Eyes rounded, hairy, lashed with long hairs. Palpus oblique, second segment densely covered by stubbly scales beneath, third one nearly of the same length as second segment, covered by clinging flat scales. Hind tibia with two pairs of spurs. Forewing with oblong *R-Cu* cell; vein *M*₁ just from down third of cell; the bases of veins *M*₂ and *M*₃ well separated.



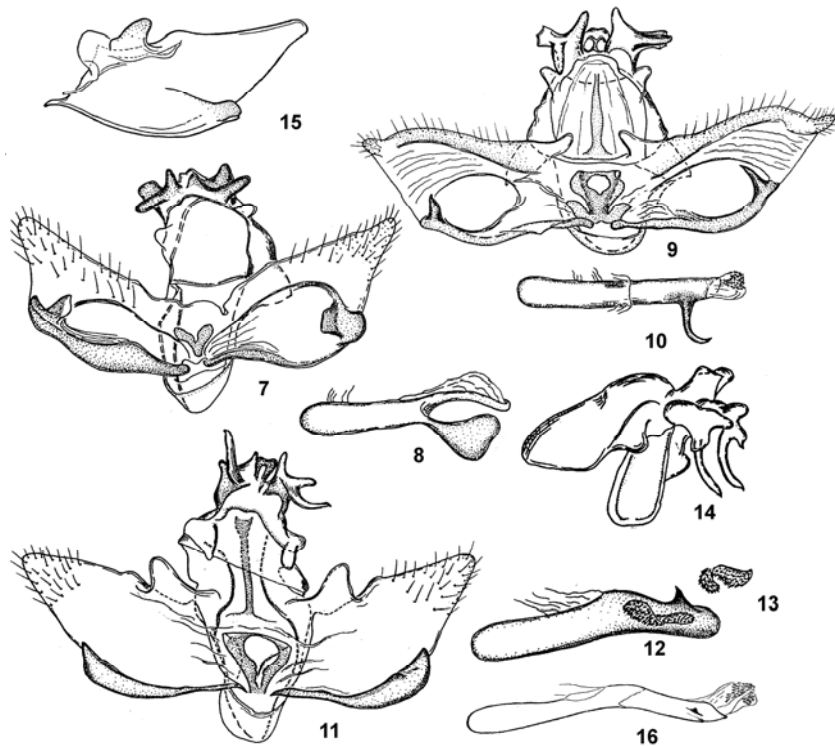
Figs 1-6. *Achlya*, adults. 1) *A. flavicornis jesoensis*; 2) *A. flavicornis sikhotensis* ssp. n.; 3) *A. longipennis*; 4 - *A. longipennis* (corresponding to ab. *tateyamai*); 5) *A. longipennis*, (corresponding to ab. *inokoi*); 6) *A. hoerbuergeri*.

Male genitalia. Uncus short, with faintly visible excavation on top; socius massive, very broad at base, with 3 processes on each top; tegumen broad, lateral sclerit of tegumen laminate, well-rounded on top; annelus long, usually with weakly sclerotized narrow band along ventral surface; valva broad, truncated oblong on distal margin, bearing well sclerotized lobe at base of costa; sacculus heavy sclerotized, with projection of various shape near apex; juxta large, well sclerotized; saccus rounded; aedeagus of elongate straight tube with subterminal process of various shape; vesica with a group of minute thorn cornuti or without it.

Female genitalia. Papillae anales wide-conic, well sclerotized, separated by two membranous cockles; apophyses posteriores wide, reach to caudal margin of 8-th segment; apophyses anteriores nearly of the same length as apophyses posteriores; ostium in membranous sinus; lamella antevaginalis wide, nearly quadrate, closed with micro-setae; ductus bursae thick and short, bearing a stout bulb near ostium, more or less conic before corpus bursae; corpus bursae ovate, with long and weakly sclerotized signum, covered by minute spines.

Key to Far Eastern species and subspecies

1. Wingspan: 42-44 mm. Forewing dark-grey, tinged with violet in basal and median areas; outer area light-colored, ash-grey. Orbicular and reniform spots lacking. Antemedian line near costal margin represented by wide black hatch with faintly visible peep between its bars (Fig. 6). In male genitalia sacculus with broad pectineal process near apex; aedeagus with broad spatular process distally; vesica without cornuti (Figs 7, 8). In female genitalia lamella antevaginalis consisting of pair of the large sclerites, occupying almost all ventral surface of 8-th sternit; corpus bursae with very narrow and weakly sclerotized signum (Fig. 18) *A. hoerbuergeri*
- Forewing grey or light-grey, without violet scales. Orbicula spot presenting, sometimes 1-3 large spots of the same colour locate also below *R-Cu* cell. Antemedian line near costal margin with broad peep between its bars. In male genitalia sacculus of another shape; aedeagus with spine or with crotchet-like process distally; vesica with cornuti. In female genitalia lamella antevaginalis consisting of pair sclerites, occupying no more than half of ventral surface of 8-th sternit; corpus bursae with well sclerotized and clearly visible signum 2
2. Forewing grey, with orbicula spot in cell only, which looks like rounded light spot. In male genitalia sacculus with moderate tubercular process in distal third; aedeagus with large spine process distally; vesica with a group of thorn cornuti on sclerotized curved plate. In female genitalia lamella antevaginalis fused together with broad sklerit to shield ostium; corpus bursae with relatively large signum in proximal part, near ostium 3
- Wingspan: 44-46 mm. Forewing pale grey, with two large pale fulvous brushstrokes of trapezoid shape in cell, which usually occupies the most part of *R-Cu* cell (sometimes divided into 2 separated blotches) and with 1-3 minute blotches of the same color below cell, between veins *M*₃, *Cu*₁ and *Cu*₂ (Figs 3-5). In male genitalia sacculus with strong thorn-like process near top; aedeagus with long ancistroid process distally; vesica with a group of minute separated cornuti (Figs 9, 10). In female genitalia lamella antevaginalis divided from sklerit to shield ostium by broad membranous interspace; corpus bursae with rather small and narrow signum in the middle part (Fig. 20) *A. longipennis*
3. Wingspan: 42-44 mm. Forewing lightish, ash-grey; orbicula spot large, looks like rounded bright spot; costal margin in the middle part between ante- and postmedian lines with two bright whitish macula; ante- and postmedian lines usually well developed, clear visible for all their dimension (Fig. 1) *A. flavicornis jesoensis*
- Wingspan: 41-43 mm. Forewing dark-grey; orbicula spot small, nearly two times smaller and faintly visible; costal margin in the middle part between ante- and postmedian lines grey, without whitish spots, sometimes faintly dusted by whitish scales only; ante- and postmedian lines reduced, clear visible near costal margin only (Fig. 2) *A. flavicornis sikhotensis* subsp. n.



Figs 7-16. *Achlya*, male genitalia. 7-8) *A. hoerbuergeri*: 7) caudal view, 8) aedeagus; 9-10) *A. longipennis*: 9) caudal view, 10) aedeagus; 11-14) *A. flavicornis sikhotensis* ssp. n.: 11) caudal view, 12) aedeagus, 13) cornutus (magnificated); 14) uncus-tegument complex; 15-16) *A. flavicornis jesoensis* (from: Inoue, 1972): 15) valva, 16) aedeagus.

***Achlya flavicornis jesoensis* (Matsumura, 1927)**

Figs 15, 16, 17, 21

Daruma jesoensis Matsumura, 1927: 15, pl. 5, fig. 38 (holotype – ♀, Maruyama in Sapporo, Hokkaido, Japan; deposited in Hokkaido University; studied).

Achlya flavicornis jesoensis: Tshistjakov, 2006: 193 (part.); Tshistjakov, 2007: 15 (part.).

MATERIAL. Sakhalin Is., "Cent. Esp. Sta., Konuma" [now: Novo-Alexandrovsk], 5.V 1933, 1 ♂ (K. Tamanuki leg.); the same locality, 1.IV-19.V 1934, 8 ♂, 3 ♀, (K. Tamanuki leg.).

DISTRIBUTION. Russia (Southern Sakhalin); Japan (Hokkaido).

HABITAT. Various types of mixed and broad-leaved forest.

HOST PLANT. *Betula* spp.

REMARKS. In the recent revision of the Eurasian Thyatirinae (Laszlo et al., 2007) this taxon is treated as a good species, separated from *A. flavicornis flavicornis* L., distributed from the Central Europe to Kazakhstan and East Siberia. However, the structure of male genitalia in *A. jesoensis* (Figs 15, 16) is nearly identical with those of *A. flavicornis* and I consider it to be conspecific with the latter. Externally *A. jesoensis* differs by ante- and postmedian lines more thick and washy, not so clear and wavy as they are in nominotypical subspecies.

***Achlya flavicornis sikhotensis* Tshistjakov subsp. n.**

Figs 11-14, 19, 22

Achlya flavicornis jesoensis: Tshistjakov, 2006: 193 (part.); Tshistjakov, 2007: 15 (part.); Streltsov & Osipov 2002: 161. Dubatolov & Dolgih, 2007: 108 (Bolshekhkhehtsirskii Nature Reserve: Kasakevichevo, Bychikha [near Khabarovsk]).

TYPE MATERIAL. Holotype – ♂, Russia, Primorskii krai, Gornotayozhnoe, 20 km SE Ussuryisk, 25.IV 1995 (E. Belyaev leg.). Paratypes: Russia, Primorskyi krai, Gornotayozhnoe, 28.IV 1982, 3 ♂ (Yu. Tshistjakov leg.); the same locality, 25,27.IV 1995, 3 ♂, 1 ♀ (E. Belyaev leg.); 6 km S Veselyi, Arsen'evka River, upper stream, 26.IV, 1.V 1996, 2 ♂, 1 ♀ (Yu. Tshistjakov leg.); Kaimanovka, 24.V 1991, 1 ♂ (Yu. Tshistjakov leg.); Okeanskaya near Vladivostok, 17, 23.IV 1996, 3 ♂, 1 ♀ (Yu. Tshistjakov leg.). Amurskaya oblast: tract Muchino near Blagoveschensk, 2.V 1995, 1 ♂ (A. Strel'tsov leg.). Khabarovskii krai: Silinskiy park, Komsomol'sk-na-Amure, 7.V 1975, 1 ♂ (V. Mutin leg.).

DESCRIPTION. Male and female. Length of forewing 18-20 mm, expanse 41-42 mm. Forewing dark-grey, with faintly visible pattern of ante- and postmedian lines; basal part of wing more light, ash-grey; subcosta in the middle part between ante- and postmedian lines grey, without whitish spots, sometimes faintly dusted by whitish scales only; antemedian line triple, with indistinct central line, arcuate from costa to hind margin; orbicula spot small, looks like greenish-white dot, not so bright as in *Achlya flavicornis jesoensis* and faintly visible; reniform spot elongated, touched with or rarely crossed by submarginal line; postmedian line double, strongly angulated outward near M_3 and weakly undulating below cell; other lines very faint, dusted by ferruginous scales.

MALE GENITALIA (Figs. 11-14): In all aspects very similar to *Achlya flavicornis jesoensis*, but valva narrower, apex of valva triangular and sacculus conic, not blunted at top.

FEMALE GENITALIA (Fig. 19): nearly the same as in *A. flavicornis jesoensis*.

DIAGNOSIS. Externally new subspecies quite differs from all known forms of this species in Europe so in East Palaearctic by lacking bright maculation along costal margin of the forewing. The other differences are as follows: in general darker, forewings intensively dusted with dark-grey scales; orbicular spot nearly two times smaller. The structure of female genitalia being nearly identical with nominotypical subspecies; male genitalia, however, somewhat differs not only from that of European specimens, but from those belonging to adjacent subspecies *Achlya flavicornis jesoensis* by shape of valva with triangular apex (in *A. f. jesoensis* valva narrower and its apex elongated).

DISTRIBUTION. Russia (Amurskaya oblast, south part of Khabarovskii krai, Primorskii krai).

HABITAT. Various types of mixed and broad-leaved forest.

HOST PLANT. *Betula* spp.

ETYMOLOGY. The subspecific name is a Latin adjective derived from the Sikhote-Alin Mountain range, referring to the region where this form mainly occurs.

***Achlya hoerburgeri* (Schawerda, 1924)**

Figs 7, 8, 18, 24

Polyploca hoerburgeri Schawerda, 1924: 90 (lectotype – ♂, Russia: "Wladiwostok", designated by Yoshimoto, 1989; deposited in the Natural History Museum, Vienna; not studied); Seitz, 1933: 286.

Achlya hoerburgeri: Yoshimoto, 1989: 160; Tshistjakov, 2006: 193; Tshistjakov, 2007: 16; Streltsov & Osipov 2002: 161 (vicinity of Blagoveschensk); Dubatolov & Dolgih, 2007: 109 (Bolshekhkhtsirskii Nature Reserve: Kasakevichevo, Bychikha [near Khabarovsk]).

MATERIAL. Amurskaya oblast: Sadovyi near Blagoveschensk, 29.IV 1973, 1 ♀ (N. Maschenko leg.). Primorskii krai: Gornotayozhnoe, 20 km SE Ussuryisk, 28.IV 1982, 1 ♂ (Yu. Tshistjakov leg.); the same locality, 24-28.IV 1995, 6 ♀ (E. Belyaev leg.)

DISTRIBUTION. Russia (Amurskaya oblast, Primorskii krai).

HABITAT. Mixed and broad-leaved forest with oak.

***Achlya longipennis* Inoue, 1972**

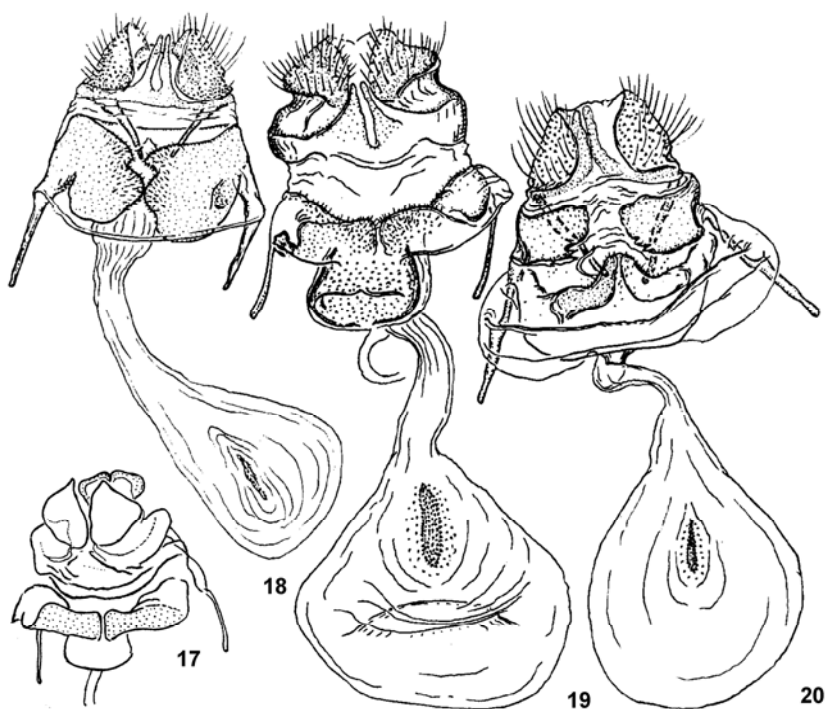
Figs. 9, 10, 20, 23

Achlya longipennis Inoue, 1972: 29, fig. 2 (holotype – ♂, Akagiyama, Gunma Pref., [central Honshu, Japan]), deposited in the collection of Natural History Museum, London, not studied); Tshistjakov, 2006: 193; Tshistjakov, 2007: 16; Dubatolov & Dolgih, 2007: 109 (Bolshekhkhtsirskii Nature Reserve: Kasakevichevo, Bychikha [near Khabarovsk]).

Achlya longipennis tateyamai Inoue, 1982: 424, Pl. 228, fig. 45, 46 (holotype – ♂, Ten-nyogahara Station, Asahidake, Mts. Daisetsu, Hokkaido Pref., Japan, deposited in the Natural History Museum, London, not studied); **syn. n.**

Achlya longipennis inokoi Inoue, 1982: 424, Pl. 54, fig. 18 (holotype – ♀, Nanae-machi, Oshima Subpref., Hokkaido Pref., Japan; deposited in the Natural History Museum, London, not studied); **syn. n.**

MATERIAL. RUSSIA, Primorskii krai: 24 km N Yasnoe, 3.V 1996, 1 ♂ (Yu. Tshistjakov leg.); Mt. El'dorado, 1350 m, 3.VI 1979, 1 ♂ (V. Vasyurin leg.); 20 km NW Laso, 16.V 2007, 19 ♂, 11 ♀ (Yu. Tshistjakov leg.); Gornotayozhnoe, 20 km SE Ussuryisk, 4.V 1981, 1 ♂ (Yu. Tshistjakov leg.); the same locality, 20.VI 1982, 1 ♂ (Yu. Tshistjakov leg.); the same locality, 24.IV 1995, 1 ♂, 1 ♀ (E. Belyaev leg.); Kaimanovka, 24.V 1991, 3 ♂ (Yu. Tshistjakov leg.); Ussuryiskyi Nature Reserve, 8.V 1995, 1 ♂ (Yu. Tshistjakov leg.); Kedrovaya Pad Nature Reserve, 30.VI 1978, 1 ♂ (Yu. Tshistjakov leg.); Okeanskaya near Vladivostok, 17, 23.IV 1996, 3 ♂, 1 ♀ (Yu. Tshistjakov leg.). JAPAN, Honshu: Gifu Pref., Nomugi-toge, 1500 m, 3-6.V 1990, 2 ♂ (H. Yoshimoto leg.); Gifu Pref., Ontake Mt., 3.V 1976, 1 ♂, 1 ♀ (H. Yoshimoto leg.).



Figs 17-20. *Achlya*, female genitalia. 17) *A. flavicornis jesoensis* (from: Inoue, 1972); 18) *A. hoerburgeri*; 19) *A. flavicornis sikhotosensis* ssp. n.; 20) *A. longipennis*.

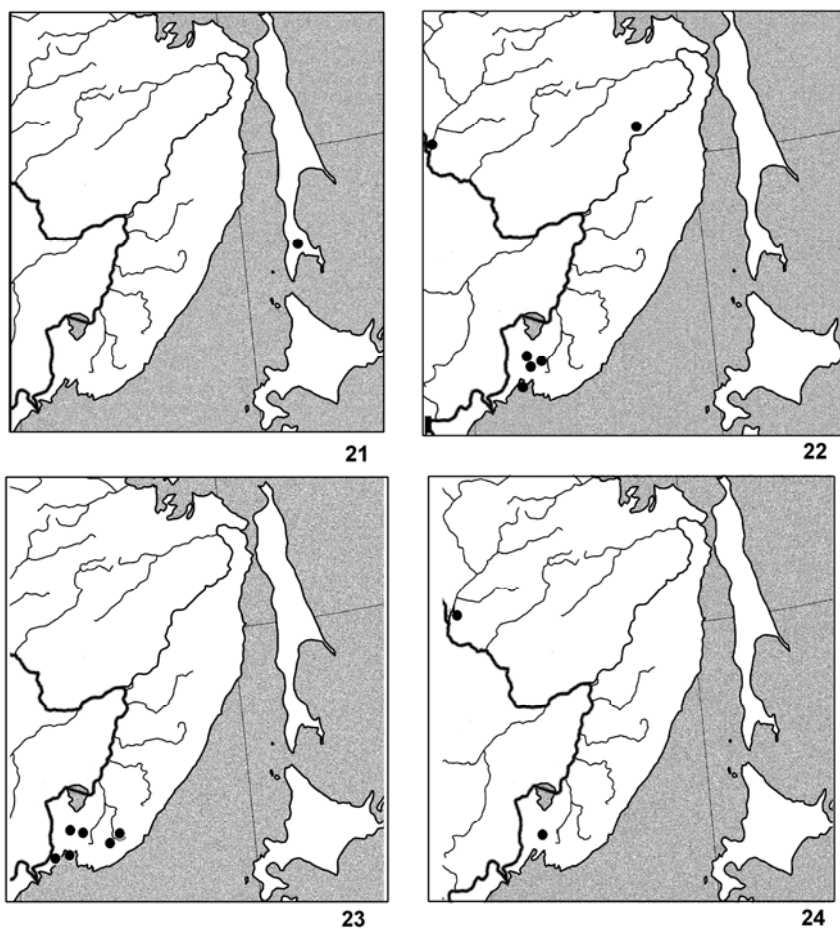
DISTRIBUTION. Russia (south part of Primorskii krai); Japan (Hokkaido).

HABITAT. Various types of mixed and broad-leaved forest.

REMARKS. The translation of original text by H. Inoue (1982: 424) in Japanese, dealing with diagnosis of *A. longipennis* and its two new subspecies is given herein: "*Achlya longipennis* Inoue. Plate 54: 16 (male), 17, 18 (female); Plate 228: 45 (male), 46 (female). Cat. 2144. Similar to the previous species [*A. flavicornis*]; light yellow spot elongated in discoidal cell with 2 or 3 spots outside discocellular vein; antemedian line more strongly angulated outward than in the previous species. The adults of the nominotypical subspecies *longipennis* (Figs 16, 17) emerges from the end of April to the end of May in the mountain range from Kanto to Chubu Region, central Honshu. This species is also found in Iwate Prefecture, northern Honshu. The wing upperside of the subspecies *tateyamai* Inoue, subsp. n. (Plate 228: 45, 46) totally dark; forewing upperside slightly purplish, postmedian line weakly incurved at CuA_2 ; submarginal line indistinct. Holotype, male: Tennyogahara Station, Asahidake, Mts. Daisetsu, Hokkaido Pref., 1380 m alt., 22.VI 1979 (Ichiro Tateyama leg.). Paratypes, 9 males and female with the same data as in holotype. The specimens are deposited in the author's collection. This subspecies is also found from Nukabira, Kamishihoro-machi and Attoko, Nemuro-shi in eastern Hokkaido, and it is uninvestigated that the population from eastern Hokkaido belongs to the same subspecies.

The subspecies *inokoi* Inoue, subsp. n. (Fig. 18) has two small orbicular spots and weakly excurved antemedian and postmedian lines; there are no other spots outside discocellular vein. Holotype, female: Nanae-machi, Oshima Subpref., Hokkaido Pref., 9.V 1977 (Tatsuo Inoko leg.). This subspecies from southern Hokkaido differs from the two subspecies mentioned above (subsp. *longipennis* and *tateyamai*) not only externally but in female genitalia also. It is possible that the subspecies *inokoi* maybe to turn out another species after the male will be examined".

Meanwhile in my possession there are some specimens from Primorskii krai and collected in the same locality, which are corresponding completely to descriptions of *tateyamai* and *inokoi* respectively and are identical to their color photographs on the proper plates. As their study revealed, all of them are neither more nor less than the individual variations of *A. longipennis*.



Figs 21-24. Distribution of species of the genus *Achlya* within Russian Far East. 21) *A. flavicornis jesoensis*; 22) *A. flavicornis sikhotensis* ssp. n.; 23) *A. longipennis*; 24) *A. hoerburgeri*.

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