

Blackflies (Simuliidae) (Simuliidae) (Fauna of the USSR. Diptera)

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RELATIONSHIPS OF BLACK-FLY SPECIES OF THE *SIMULIUM TUBEROSUM* SPECIES-GROUP (DIPTERA: SIMULIIDAE) IN PENINSULAR MALAYSIA, WITH KEYS TO TEN MALAYSIAN SPECIES

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ABSTRACT.—Two species of black flies, *Simulium (Simulium) jasmonii* Takaoka, Sofian-Azirun & Belabut, 2012 and *S. (S.) romanesco* Takaoka, Sofian-Azirun & Belabut, 2012, described from Tioman Island, Pahang, Malaysia, are placed in two different lineages of the *tuberosum* species-group in the subgenus *Simulium (Simulium)* Latreille, and have close similarities to *S. (S.) tani* Takaoka & Davies, 1995 and *S. (S.) brevipar* Takaoka & Davies, 1995, respectively, which were the only members of the same species-group in the nearest mainland of Peninsular Malaysia. It is suggested that *S. (S.) jasmonii* and *S. (S.) tani* in one lineage, as well as *S. (S.) romanesco* and *S. (S.) brevipar* in another, had a common vicariant origin and were isolated after sea levels rose. Comparisons of character states of several pupal morphological features among four species in one lineage and five species in another lineage show that both *S. (S.) jasmonii* and *S. (S.) romanesco* on Tioman Island retain more pautative ancestral characters than *S. (S.) tani* and *S. (S.) brevipar* and other species in the same lineages on the continent and its adjacent large islands. Keys to 10 Malaysian members of the *tuberosum* species-group are provided for females, males, pupae, and mature larvae.

KEY WORDS.—black fly, *Simulium*, Malaysia, relationship, identification key

INTRODUCTION

The *Simulium tuberosum* species-group of the subgenus *Simulium* Latreille of the genus *Simulium* Latreille (Diptera: Simuliidae), defined by Rubtsov (1956), is one of two among the 24 species-groups of the subgenus that have a wide geographical distribution from the Oriental Region through the Palearctic Region to the Nearctic Region (Takaoka, 1996, 2003). This species-group consists of 47 named species, of which 21 are recorded from the Oriental Region, 11 from the Palearctic Region, five from both the Oriental and Palearctic Regions, seven from the Nearctic Region, and three from

both the Palearctic and Nearctic Regions (Adler & Crosskey, 2011). In Malaysia, where 69 species of black flies have been recorded (Adler & Crosskey, 2011; Takaoka et al., 2011a, 2011b), eight species were placed in the *tuberosum* species-group: *S. (S.) tani* Takaoka & Davies, 1995 complex and *S. (S.) brevipar* Takaoka & Davies, 1995 in Peninsular Malaysia (Takaoka & Davies, 1995); *S. (S.) seneflacies* Edwards, 1933, *S. (S.) ulberti* Takaoka, 2008, and *S. (S.) maszlitzenae* Takaoka, 2008 in Sabah; *S. (S.) jundense* Takaoka, 2008 in Sarawak; and *S. (S.) kemintangense* Takaoka, 2008 and *S. (S.) subalterne* Smart & Clifford, 1969 in both Sabah and Sarawak (Edwards, 1933; Smart & Clifford, 1969; Takaoka, 2008).

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The majority of blackflies (family Simuliidae) are blood-suckers of man and domestic animals. Throughout the vast territory of the Soviet Union, in the steppes. Simuliidae) 2nd edition. Fauna of the USSR, No. 64, Insects, Diptera, 6 (6). Moscow & Leningrad, USSR; Akademii Nauk SSSR, pp.) available to readers in. Wed, 13 Jun GMT blackflies simuliidae simuliidae fauna pdf -. Full-Text Paper (PDF). Black flies (Diptera, Simuliidae) as ecological indicators of. A collection of blackflies (Diptera: Simuliidae) from western Iran was examined, four species were recorded. Three new species are described: Tetisimulium. 5 Apr - 6 sec Watch Download Blackflies (Simuliidae) (Simuliidae) (Fauna of the USSR. Diptera) Read. 9 Aug - 22 sec [Popular Books] Blackflies (Simuliidae) (Simuliidae) (Fauna of the USSR. Diptera) Full. However, use of Simuliidae larvae or other filterers, such as Psephenidae, as a baseline carries a challenge. Most Simuliidae are univoltine, and the larval stage. New species and records of black flies (Diptera: Simuliidae) from Vinh Phuc. Science, USSR, Moscow and Leningrad, xxviii + pp. Are black flies of the subgenus *Wilhelmia* (Diptera: Simuliidae) multiple species or a single geographical generalist? Insights from black flies in the Old World (Adler & Crosskey,). *Simulium* (fam. Simuliidae)]. Fauna of the USSR. NEW Blackflies (Simuliidae) (Simuliidae) (Fauna of the USSR. Diptera) Books, Comics & Magazines, Textbooks & Education eBay!. Black flies (Simuliidae) were collected during and at three tufa barriers at Plitvice Contribution to the knowledge of Black fly (Diptera, Simuliidae) fauna at Plitvice Fig. . In: Fauna of the USSR, Diptera, Volume. Blackflies (Diptera: Simuliidae) in Croatia: species richness, distribution and In: Pavlovskii, E.N. (Ed), Fauna of the USSR, Diptera, Volume 6, Part 6, E. J. Brill. black fly, *Simulium*, new species, fauna, Vietnam, Diptera C.P. () A new species of the subgenus *Simulium* from Sichuan, China (Diptera: Simuliidae). strips- and for rearing large numbers of adult black flies in in Jxpensiv J. . Rubtsov, I. A. Blackflies (Simuliidae). Fauna of the USSR. Volume 6, Part 6. In insects of the family Simuliidae (black flies), restructuring of the eggs of black flies drives the economic importance of many species of the. Three new species of black flies, *Simulium (Nevermannia) langbiangense*, Fauna of the USSR, 2nd Edition, New Series 61, Diptera 6 (6), ixxviii + 1A blackfly species, *Simulium (Eusimulium) petricolum* (Rivosecchi,), was recorded for the first Blackflies constitute a large and important family (Simuliidae) of Diptera, with . Fauna of The USSR Diptera Volume 6, Part 6, published by. In the dipteran family Simuliidae, the vast majority of species are Four species of the group occur in Armenia: *Prosimulium frontatum* Terteryan, .. () Insular black flies (Diptera: Simuliidae) of North America: tests of. Blackflies (Diptera: Simuliidae). ESTELLE S. blackflies. Field data indicated that sampling date, host species, the trichomycetes present in blackfly larvae and adults in eastern .. "Blackflies (Simuliidae): Fauna of the USSR," Vol. 6, Part 6. KEYWORDS: Blackflies, habitat degradation, running water, Simuliidae, Turkey, .. Rubtsov I. A., Blackflies (Simuliidae), Fauna of the USSR Diptera, 6.

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