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Sexual morphs and colour variants of *Aphis* (formerly *Toxoptera*) *odinae* (Hemiptera, Aphididae) in Japan

ROGER L. BLACKMAN[1], MASATO SORIN[2] & MASAHISA MIYAZAKI[3]

[1]*Department of Entomology, The Natural History Museum, London SW7 5BD, UK. E-mail: r.blackman@nhm.ac.uk*
[2]*Kogakkan University, Kuratayama, Ise, Mie, 516 Japan. E-mail: s.masato@amigo2.ne.jp*
[3]*Inventory Center, National Institute for Agro-Environmental Sciences, Kannondai 3-1-3, Tsukuba, Ibaraki, 305 Japan. E-mail:mcallis@affrc.go.jp*

Abstract

Recent molecular studies have shown that the genus *Toxoptera* is polyphyletic, and in particular that the name of the aphid known since 1952 as *Toxoptera odinae* (van der Goot) should revert to *Aphis odinae* (van der Goot), **stat. rev.** In this paper oviparae, alate males and fundatrices of *A. odinae* are described for the first time, from Japan. *A. odinae* is common as a grey-brown or rust-brown aphid on numerous plant species of shrubby habit throughout the Old World tropics and subtropics, but in temperate east Asia much darker forms occur, and Japanese populations of *A. odinae* include a dark green form not found elsewhere in the world. Multivariate morphometrics were used to confirm that both colour forms of the aphid in Japan were conspecific with samples from other parts of the world. *Pergandeida kalopanacis* Hori 1927 is a new synonym of *A. odinae*.

Introduction

Aphis (formerly *Toxoptera*) *odinae* (van der Goot) is a common sight throughout the Old World tropics and subtropics on numerous plant species, especially those of shrubby habit. It is known as a mid grey-brown to reddish-brown aphid forming dense colonies on young stems or on the undersides of leaves along the main veins, invariably attended by ants. In Africa and most of Asia it reproduces parthenogenetically throughout the year, and until now no sexual morphs have been recorded.

We now report the occurrence of the sexual phase of *A. odinae* on host plants in several different genera in Japan, and describe the ovipara and alate male, and also the fundatrix. Populations in Japan also exhibit a hitherto undescribed colour polymorphism in the parthenogenetic phase, with dark green as well as brown individuals that sometimes occur in mixed colonies, in contrast to the consistently brown colour of this aphid in most countries. We used multivariate morphometrics to demonstrate that the different colour morphs in Japanese populations are all one species, and that they are the same species as found in other parts of the world.

Generic placement of *Aphis odinae.* Van der Goot (1917) originally described this species from Indonesia in the genus *Longiunguis*. It was placed in the genus *Aphis* by Takahashi (1924), but transferred to *Toxoptera* by Eastop (1952) because of the presence of structures with the potential to function as a stridulatory apparatus; a short row of modified peg-like hairs on the hind tibiae and a ventrolateral series of ridges on the 5th and 6th abdominal sternites. These structures produce an audible sound in the type species of the genus *Toxoptera aurantii* (Boyer de Fonscolombe), in which species the cuticular ridges are particularly well-developed and clearly function as a file or strigil (Broughton & Harris 1971). Other species of *Toxoptera* have peg-like tibial hairs, but the ventrolateral cuticular ridges although present are finer and much less evident, and are unlikely to be functional. Weakly developed ventrolateral cuticular ridges are found in many *Aphis* species, including *Aphis nerii* Boyer de Fonscolombe. Rows of peg-like hind tibial hairs are present in certain other Aphidini, including *Aphis eugeniae* van der Goot, and the hind tibiae of the immature stages of many *Aphis* spp. have similar hairs. Peg-like hind tibial hairs are also found in species of three genera of Macrosiphini, although in that tribe a different row of hairs is modified (Holman 1994).

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