



JOHN CURTIS AND HIS LEAFHOPPERS WITH NOMENCLATURAL NOTES ON SOME SPECIES (HEMIPTERA, AUCHENORRHYNCHA, CICADELLIDAE) WITH SPECIAL REFERENCE TO THE STATUS OF *EUPTERYX SOLANI* CURTIS 1846

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Abstract - Leafhopper specimens collected and described by John Curtis in the genus *Aphrodes*, housed in the Museum Victoria, Australia have been examined. For all but one species no specimens seem eligible to be regarded as syntypes. The following species are regarded as nomina dubia: *Aphrodes puella* Curtis 1829, *Aphrodes insularis* Curtis 1837, *Aphrodes pallidipennis* Curtis 1837, *Aphrodes maculipennis* Curtis 1837, *Aphrodes taeniola* Curtis 1837, *Aphrodes maculipes* Curtis 1837, *Aphrodes unimaculata* Curtis 1837, *Aphrodes lata* Curtis 1837. The lectotype of *Aphrodes sabulicola* Curtis 1837 (now *Psammotettix sabulicola* (Curtis)) is designated. In addition, the status of *Eupteryx solani* Curtis 1846 (now *Empoasca*) is discussed. Without a clear description and in the absence of any valid type material the species is regarded as a nomen dubium. *Eupteryx pteridis* Dahlbom 1850 is regarded as the valid name for the species now known as *Empoasca pteridis*.

KEY WORDS: Hemiptera, Cicadellidae, John Curtis, *Empoasca pteridis*

Izveček – JOHN CURTIS IN NJEGOVI ŠKRŽATKI Z NOMENKLATURNIMI ZAZNAMKI O NEKATERIH VRSTAH (HEMIPTERA, AUCHENORRHYNCHA, CICADELLIDAE) S POSEBNIM OZIROM NA STATUS VRSTE *EUPTERYX SOLANI* CURTIS 1846

Preučeni so bili primerki škržatkov, ki jih je zbral in opisal John Curtis v rodu *Aphrodes* in so shranjeni v muzeju Victoria v Avstraliji. Razen pri eni vrsti nobenega

primerka ne moremo obravnavati kot sintipskega. Naslednje vrste obravnavamo kot nomina dubia: *Aphrodes puella* Curtis 1829, *Aphrodes insularis* Curtis 1837, *Aphrodes pallidipennis* Curtis 1837, *Aphrodes maculipennis* Curtis 1837, *Aphrodes taeniola* Curtis 1837, *Aphrodes maculipes* Curtis 1837, *Aphrodes unimaculata* Curtis 1837, *Aphrodes lata* Curtis 1837. Določen je lektotip vrste *Aphrodes sabulicola* Curtis 1837 (sedaj *Psammotettix sabulicola* (Curtis)). Poleg tega je obravnavan status vrste *Eupteryx solani* Curtis 1846 (sedaj *Empoasca*). Brez jasnega opisa in v pomanjkanju veljavnega tipskega materiala je vrsta smatrana za nomen dubium. *Eupteryx pteridis* Dahlbom 1850 je smatrano za veljavno ime te vrste, sedaj znane kot *Empoasca pteridis*.

KLJUČNE BESEDE: Hemiptera, Cicadellidae, John Curtis, *Empoasca pteridis*

Introduction

John Curtis (1791–1862), entomologist and one of the most accomplished natural history artists of his era, was the author of *British Entomology*, one of the most important and beautiful entomological texts of the nineteenth century. He is sometimes described as the first professional entomologist. John Curtis was born in Norwich, UK; his father died while John was very young and his mother Frances, took up flower growing to support her family and instilled a love of natural history in John.

At some time between 1817 and 1819 Curtis moved to London. There he met Sir Joseph Banks (1743–1820) who introduced him to William Elford Leach (1790–1836), assistant keeper of the natural history department in the British Museum, with whom Curtis studied shells. It was through Leach that Curtis met the entomologist James Charles Dale (1791–1872), who became his lifelong friend and patron.

Indeed, it was Dale who helped finance Curtis's *magnum opus*, *British Entomology* and who supplied Curtis with much of the material for it. *British Entomology* was published monthly by subscription in 193 monthly parts, each consisting of around four plates and two pages of text. A total of 16 volumes were produced and each of the 770 beautifully executed hand-coloured plates depicts a single species of insect together with the plant upon which its larval stage fed or was most commonly found.

By 1840 Curtis's eyes were beginning to trouble him, and he also had financial problems and was disillusioned so he decided to turn his attention to practical matters. He began to concentrate on the study of insect pests affecting the horticultural and agricultural industries, publishing a number of articles on this subject in the *Gardener's Chronicle*, under the pseudonym Ruricola. His major work in this area was *Farm insects* (1860, reissued 1883): being the 'natural history and economy of the insects injurious to the field crops of Great Britain and Ireland'.

His eyesight had begun to fail completely by 1855 and eventually he became totally blind. Curtis died in 1862 and after his death his second wife, Matilda, negotiated the sale of his collections of insect specimens through Dr John Gray of the British Museum. The highest bidder was Professor McCoy, from the National Museum of

Victoria, who paid £510 for the insect collection and £100 for the agricultural collection. The Curtis Insect Collection was placed in zinc-lined cabinets and sailed to Australia on the *Prince of Wales*, arriving some time in late 1863.

The contents of the Curtis Collection comprises 38,031 specimens: 9,595 Coleoptera, 7,290 Lepidoptera, 7,715 Hymenoptera, 5,878 Diptera, 3,072 Hemiptera and 4,481 Exotic species. There are also approximately 1,000 Agricultural insects specimens. The oldest specimen dates to 28 August 1796.

The importance of John Curtis and his work cannot be overemphasized, his illustrations are among the finest ever produced, and his collection contains at least 1000 type species. His collection in Museum Victoria is also intact and has not been broken up or amalgamated with others. It remains a unique record of the knowledge of the British fauna in the early part of the 19th century.

Curtis' leafhoppers

Only a very small portion of the Curtis leafhopper collection has been examined for this study in order to clarify the status of several names used in the British and European literature. This is part of preparations to produce a new checklist of the British Hemiptera fauna.

The following species were included by Curtis (1837) and 'described from my cabinet' in the following order. All were published under the generic name *Aphrodes*, which, as with so many genera has a greatly restricted usage now.

1. *concinna* Curtis 1837
2. *testudo* Curtis 1833
3. *rivularis* Germ? [Germar 1821]
4. *puella* Curtis 1829
5. *insularis* Curtis 1837
6. *costata* Curtis 1837
7. *pallidipennis* Curtis 1837
8. *maculipennis* Curtis 1837
9. *sabulicola* Curtis 1837
10. *sulphurea* Curtis 1837
11. *taeniola* Curtis 1837
12. *craticula* Curtis 1837
13. *maculipes* Curtis 1837
14. *nitida* Curtis 1837
15. *unimaculata* Curtis 1837
16. *lata* Curtis 1837
17. *pulverulenta* Curtis 1837

These species are treated in more detail below. Some names have already been synonymised or at least considered to be junior synonyms for other species. Of the remainder, with exception of *A. sabulicola*, all these '*Aphrodes*' species were treated

as ‘Deltocephalinae of uncertain generic position’ in Nast (1972). They were listed in Metcalf (1963) under *Aphrodes* but otherwise have not been mentioned in other literature. Edwards (1896) did not mention them at all in his classic “*The Hemiptera Homoptera of the British Islands*”- perhaps because the Curtis collection had been sent to Australia in 1863 and was effectively unavailable for study at that time.

1. *Aphrodes concinna* Curtis 1837

Aphrodes concinna Curtis 1829: 193 (nomen nudum)

Aphrodes concinna Curtis 1837: pl 633

Regarded as *Anoscopus albifrons* (L) var. *dispar* by Marshall 1866: 177 and by Douglas & Scott 1876: 74

2. *Aphrodes testudo* Curtis 1833

Aphrodes testudo Curtis 1829 (nomen nudum)

Aphrodes testudo Curtis 1833: 195 (n.sp.)

Aphrodes testudo Curtis 1837 (described)

Regarded as *Anoscopus albifrons* (L) var. *dispar* by Marshall 1866: 177 and by Douglas & Scott 1876: 74.

3. *Aphrodes rivularis* Germ? [Germar 1821]

Jassus rivularis Germar 1821: 89.

Aphrodes rivularis Germ ? Curtis 1837: pl 633 described.

Regarded as *Anoscopus flavostriatus* Donovan by Douglas & Scott 1876: 75.

4. *Aphrodes puella* Curtis 1829

Aphrodes puella Curtis 1829: 193 (nomen nudum)

Aphrodes puella Curtis 1837: pl 633 (n.sp.)

Aphrodes puella Marshall 1866: 224

Original description. “Greenish or brownish white, head with an oval ring of black dots, face and legs spotted with black, base of thighs piceous, elytra with 9 or 10 brown spots, with the apex of the same colour, the nervures and the spaces between 2 brown spots on the costa towards the apex, pearly white 11/4”.

Specimens examined: none present- either in Australia or in Oxford [Oxford Museum of Natural History has much of the Dale material]

There seems to be some doubt if any specimens eligible to be types exist. However, Marshall (1866: 224) cited the species as being ‘insufficiently characterized’ and yet felt able to say he had collected 4 specimens. No other author has discussed or characterized the species. Nast (1972) lists the species as of ‘uncertain generic position’. It seems appropriate to regard the species as **nomen dubium**.

5. *Aphrodes insularis* Curtis 1837

Aphrodes insularis Curtis 1837: pl 633. (n.sp)

Original description. “Ochreous, head with 2 triangular and 2 round dots at the apex; elytra with the spaces between the nervures margined with brown, costs brown towards the apex with 2 pale spots; abdomen blackish with a white band at the apex.”

Specimens examined: 4 specimens on 2 pins. 2 female labeled in pencil under the mount 21.6.[18]42. Langford. 2 female. 26.6.[18]42 off grassy [unreadable]. None of these specimens are eligible as type material since all collected after date of description.

Identification of these specimens: *Deltocephalus pulicaris* Fallén 1806.

All entries in Metcalf 1963: 183 refer to listings of the name only and no re-description. Nast (1972) lists the species as of ‘uncertain generic position’.

For this species we cannot be certain if any of the specimens standing under this name were used in the descriptions or added later. Those specimens that are labeled seem to have been collected later than the date of description.. In the light of this it seems appropriate to regard the species as **nomen dubium**.

6. *Aphrodes costata* Curtis 1837

Aphrodes costata Curtis 1837: pl 633

Regarded as *Anoscopus albifrons* (L) (Nast 1972: 235). *A. costata* Curtis 1837 is listed as a synonym.

7. *Aphrodes pallidipennis* Curtis 1837

Aphrodes pallidipennis Curtis 1837: pl 633 (n.sp.)

Original description. “Ochreous with a greenish tinge; elytra slightly reticulated with brown at the apex; face with several brown ribs 1 2/3”.

Specimens examined: 4 pins; 1 female *Psammotettix*, no data. 1 male *Psammotettix*, 1/7/?? Date on reverse of card in pencil. 2 female *Psammotettix*, no data.

All entries in Metcalf 1963: 185 refer to listings of the name only and no re-description. Marshall’s (1866: 266) referral of this species to [*Verdanus*] *abdominalis* Fabricius 1803 is regarded as an error but he refers to the species as being ‘insufficiently characterised’. Nast (1972) lists the species as of ‘uncertain generic position’.

For this species we cannot be certain if any of the specimens standing under this name was used in the descriptions or added later. In the light of this it seems appropriate to regard the name as **nomen dubium**.

8. *Aphrodes maculipennis* Curtis 1837

Aphrodes maculipennis Curtis 1837: pl. 633 (n.sp)

Original description. “Ochreous, clypeus with a brown spot and a curved line on the cheeks, face brown with 7 curved ochreous ribs on each side; crown with 2 small and 2 large spots; thorax with 4 brown stripes; abdomen black above except at the apex; elytra variegated with brown, except on the costa 1 3/4”.

Specimens examined: 2 female on separate pins. One appears to be Dale’s specimen. Neither with any data and also do not agree with original description.

Identification of specimens: ?*Psammotettix* sp.

All entries in Metcalf 1963: 184 refer to listings of the name only and no re-description. Nast (1972) lists the species as of ‘uncertain generic position’.

For this species we cannot be certain if any of the specimens standing under this name was used in the descriptions or added later. There are no data labels on any of them. One seems to have been collected and prepared by Dale. It seems appropriate to regard the name as **nomen dubium**.

9. *Aphrodes sabulicola* Curtis 1837

Aphrodes sabulicola Curtis 1837: pl. 633 (n.sp.)

Now *Psammotettix sabulicola* (Curtis) type species of *Psammotettix* (Deltocephalinae).

Original description. "Pale ochreous, upper part of face and crown variegated with ferruginous brown; abdomen black, sides and apex ochreous; elytra glaucous when closed, with 5 brown spots and smaller ones near the apex; nervures pearly white; wings with a fuscous spot at the apex."

Original data: "4th June, not uncommon on the sand hills near Lowestoft". [Suffolk, UK]

Specimens examined:

1 male: labelled : 4 June on sandhills near Lowestoft. Here designated as lectotype.

Other specimens: 1 male ?*Sardius*, 1 male *Psammotettix* sp, no data. 1 *Psammotettix* female 20/8/[18]42 'Caurwood'. 1 male *Doratura stylata* Boheman [data unreadable].

The lectotype specimen agrees both with the description and the illustration. Given that is it the type species of the genus *Psammotettix* is seems appropriate to designate the lectotype at this time.

10. *Aphrodes sulphurea* Curtis 1837

Aphrodes sulphurea Curtis 1837: pl. 633 (n.sp.)

Now regarded as *Thamnotettix confinis* (Zetterstedt 1828)

11. *Aphrodes taeniola* Curtis 1837

Aphrodes taeniola Curtis 1837: pl. 633 (n.sp.)

Original description. "Ochreous, clypeus and cheeks with 5 vertical stripes, face with a double row of back ribs, crown with a black band, thorax dotted with black; elytra duller, legs spotted piceous, hinder tibiae with a stripe down the inside".

Specimen examined: 1 female labeled 26 July [year unreadable].

Identification of this specimen: *Conosanus obsoletus* (Kirschbaum 1868).

All entries in Metcalf 1963: 196 refer to listings of the name only and no re-description. Nast (1972) lists the species as of 'uncertain generic position'.

For this species we cannot be certain if the specimen standing under this name was used in the description or added later. The data label gives only a date with uncertain year. In the light of this it seems appropriate to regard the name as **nomen dubium**.

12. *Aphrodes craticola* Curtis 1837

Aphrodes craticola Curtis 1837: pl. 633 (n.sp.)

Now regarded as *Speudotettix subfuscus* (Fallen 1806) and listed as a synonym by Fieber 1872.

13. *Aphrodes maculipes* Curtis 1837

Aphrodes maculipes Curtis 1837: pl. 633 (n.sp.)

Original description. "Dark ochreous, cheeks, 3 dots and many ribs on the face black; crown, anterior margin of the thorax and scutel (sic) with black dots, the latter with a cross; apex and inner margin of elytra with fuscous spots; wings fuscous; base of anterior thighs black, hinder legs striped and dotted; female less marked".

Specimens examined: 7 female (7 pins) no data.

Identification of specimens: *Speudotettix subfuscus* (Fallén, 1806).

All entries in Metcalf 1963: 184 refer to listings of the name only and no re-description. Nast (1972) lists the species as of 'uncertain generic position'.

For this species we cannot be certain if any of the specimens standing under this name was used in the descriptions or added later. There are no data labels on any of them. One at least is a Dale specimen. In the light of this it seems appropriate to regard the name as **nomen dubium**.

14. *Aphrodes nitida* Curtis 1837

Aphrodes nitida Curtis 1837: pl. 633 (n.sp.)

Now regarded as *Euscelis lineolatus* Brullé 1832

15. *Aphrodes unimaculata* Curtis 1837

Aphrodes unimaculata Curtis 1837: pl. 633 (n.sp.)

Original description: "Dull ochreous, face with imperfect ribs, head with fuscous dots, scutel with one black dot at the base, elytra partially freckled, abdomen black at the base, with black dots down to the apex; legs spotted, hinder tibiae striped".

Specimens examined: 5 in total: 1 female no data, 1 female 31 Aug ??, 1 female no data, 1 female no data, 1 male Dale specimen.

Identification: *Euscelis* sp.

All entries in Metcalf 1963: 207 refer to listings of the name only and no re-description. Nast (1972) lists the species as of 'uncertain generic position'.

For this species we cannot be certain if any of the specimens standing under this name was used in the descriptions or added later. There are no data labels on all but one of them (one seems to have been collected and prepared by Dale). In the light of this it seems appropriate to regard the species as **nomen dubium**.

16. *Aphrodes lata* Curtis 1837

Aphrodes lata Curtis 1837: pl. 633 (n.sp.)

Original description: "Broad, shining ochreous, base of abdomen freckled with black, a line of dots down the back and oviduct piceous".

Specimens examined: 3 pins. 2 female no data, 1 male 26.7.[18]42. Date of collection of this specimen is later than date of description.

Identification: *Conosanus obsoletus* (Kirschbaum 1868)

All entries in Metcalf 1963: 189 refer to listings of the name only and no re-description. Nast (1972) lists the species as of ‘uncertain generic position’.

For this species we cannot be certain if any of the specimens standing under this name was used in the descriptions or added later. In the light of this it seems appropriate to regard the species as **nomen dubium**.

17. *Aphrodes pulverulenta* Curtis 1837

Aphrodes pulverulenta Curtis 1837: pl. 633 (n.sp.)

Now regarded as *Aphrodes bicincta* (Schrank 1776)

Curtis species from 1846

Eupteryx solani Curtis 1846

Eupteryx solani Curtis 1846: 388

Typhlocyba pteridis Dahlbom 1850: 179

Empoasca pteridis Dahlbom (1850)

The following synonyms are as given in Nast 1972: 267

Typhlocyba solanituberosa Kollar 1852: 5

Chlorita solani roseiventris Rey 1894: 46

Empoasca tullgreni Ribaut: 1933: 173

Empoasca dlabolae Lindberg 1960: 67

Eupteryx solani [now *Empoasca solani*] was described in a paper in Gardeners Chronicle (1846) by Curtis, under the pen-name ‘Ruricola’. He writes that the species is “nearly allied to *Tettigonia flavescens* (Fabricius)” (= *Empoasca vitis* Goethe) but found on potatoes in the autumn. This information and details of the biology was also given in Curtis (1860 reissued 1883) and some additional information on a species he called *Eupteryx picta* Fabricius (= *Eupteryx atropunctata* Goeze)

The description of *solani* as given by Curtis (1846) could apply to almost any *Empoasca* leafhopper and the only clue to its identity is the hostplant. However, in the UK, *Empoasca decipiens* Paoli may also be found in similar situations on herbaceous and other plants as also noted by Ribaut (1936) who suggested that *solani* could either be synonym of his *tullgreni* (= *pteridis*) or equally of *decipiens*.

The names *solani* and *pteridis* seem to have used more or less equally in the literature but seem also to have been confused with other *Empoasca* species. Ossiannilsson (1981) used the name *solani* and treats the species *pteridis* Dahlbom 1850 as a synonym. However, others have used *pteridis* (eg Nickel, 2003) and Remane & Fröhlich (1994) have strongly suggested the name *solani* should not be used because of the doubts about its identity.

Davis (1983) was the first to confirm that *Empoasca pteridis* was found in the UK, in London at the Chelsea Physic Garden, where the species was found together with *E. decipiens* and *E. vitis* (Goethe).

Specimens standing under the name *solani* in Museum Victoria: 1 female labelled *Eupteryx picta*, dissected on a card. 1 male *Alebra wahlbergi* (Boheman) 21.7.[18]52.

2 specimens of *Chlorita viridula* (Fallén) 1 female + 1 female 1 male + nymph of *Limotettix striola* (Fallén). No specimens of any *Empoasca* are present.

We cannot be certain what species Curtis actually had observed - it is equally possible he examined *decipiens* or what he called *solani* but no specimen of an *Empoasca* is actually present in the collection under the name *solani*.

A search using "Google™" (August 2007) showed around equal numbers of citations to '*Empoasca + solani*' and for '*Empoasca + pteridis*'. On this basis the selection of a neotype to preserve the name *solani* is hard to argue. It seems that the best course of action is to argue that *Eupteryx solani* Curtis should be regarded as a **nomen dubium**, and to use *pteridis* Dahlbom as the valid name for the species.

The Dahlbom type of *Typhocyba pteridis* has been examined. It is a pinned specimen, covered in mould. The original data state it was collected in Gotland (Sweden) on 2 July [1850?] It is a male and the genitalia are prepared on a microslide on the same pin as the specimen. The diagnostic characteristic of the genitalia, the process arising from the style is clearly visible. Good illustrations of the male genitalia (as *solani*) are given by Ossiannilsson (1981: 425).

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