

Three new beetle vectors of rice yellow mottle virus in Kenya¹

W. BAKKER

National Agricultural Laboratories, Nairobi, Kenya

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Rice yellow mottle virus (RYMV) – x/x:x/x:S/S:Cl – a mechanically transmissible virus of rice, is found near Kisumu (Nyanza Province) in Kenya. It is transmitted by the beetle *Sesselia pusilla* Gerstaecker (fam. *Chrysomelidae*, *Galerucinae*) (Bakker, 1970). The locally high incidence of rice yellow mottle at the Ahero Pilot Scheme where *S. pusilla* was not seen in large numbers, indicated that more vectors of this virus might exist. This paper reports three new beetle vectors of RYMV.

The beetles were collected on rice or other Gramineae in the field, allowed to feed on mechanically infected rice 'Sindano' for 2–4 days, and were then transferred singly or in groups of 2–5 insects to young 'Sindano' seedlings for 3–6 days, depending on the feeding damage caused to the test plants. The test plants were grown in sterilised compost and were placed in an insect-proof glasshouse after inoculation feeding of the insects. Per beetle group two plants with rice yellow mottle symptoms were tested with antiserum to RYMV in the agar-gel diffusion test.

The beetles – all belonging to the family Chrysomelidae – are: *Chaetocnema pulla* Chapuis (Halticinae) (Fig. 1), *Trichispa sericea* (Guérin) (Hispidinae) (Fig. 2), and *Dicladispa* (*Chrysispa*) *viridicyanea* (Kraatz) (Hispidinae) (Fig. 3).

C. pulla was collected with a sweeping net from fresh shoots of ratoon rice 'Sindano' and 'Basmati 217' at the Irrigation Research Station Ahero. These rice plants showed feeding damage and symptoms of rice yellow mottle. *T. sericea* was collected with a mouth aspirator from ratoon rice 'Sindano' in just-flooded fields which were under tillage at the Mwea Irrigation Settlement (Central Province). Very large numbers of beetles were collected on a single plant. The disease does not occur in this area. *T. sericea* was given a fasting period of 17 h prior to virus acquisition. *D. viridicyanea* was collected with a sweeping net on grasses at Otonglo (Nyanza Province).

The three insect species are leaf feeders. The adults eat the surface of the leaves parallel to the veins (Fig. 4).

The results of the transmission tests (Table 1) clearly show that adults of the three beetle species tested were able to transmit the virus to healthy rice seedlings and consequently are potential vectors of this virus. Sap of plants infected after feeding by the three vector species reacted with antiserum to RYMV.

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Fig. 1. Adult beetle *Chaetocnema pulla*.

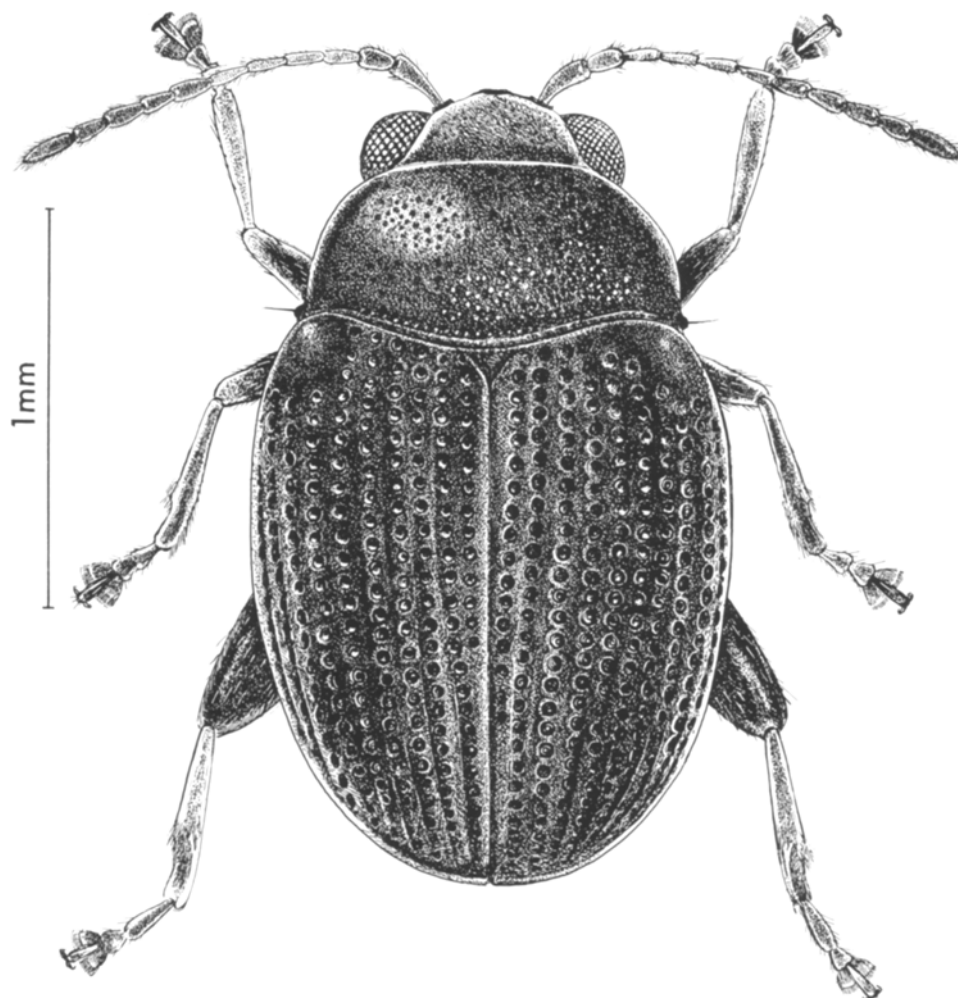


Fig. 1. Volwassen kever *Chaetocnema pulla*.

Table 1. Transmission of rice yellow mottle virus by beetles collected from rice fields and grasses.
* number of rice seedlings infected/number of rice seedlings the beetles fed upon.

Beetle species	Number of beetles per test plant			
	1	2	3	5
<i>Chaetocnema pulla</i>	9/45*		1/1	41/64
<i>Trichispa sericea</i>	4/15			12/15
<i>Dicladispa (Chrysispa) viridicyanea</i>	1/3	2/2		

Tabel 1. Overdracht van 'rice yellow mottle' virus door kevers verzameld in rijstvelden en op grassen.
* aantal geïnfecteerde planten/aantal planten waarop de kevers zich gevoed hebben.

The insects here reported belong to subfamilies of which several species are known to be pests of rice. For the subfamily Hispinae it is the first record that these beetles are able to transmit a virus.

T. sericea is a pest of rice in several African countries (Grist and Lever, 1969) especially Madagascar (Bouriquet, 1949). At the Mwea Irrigation Settlement in Kenya these insects are controlled with DDT in the nurseries and in the fields. The fact that so large numbers of insects were caught on ratoon rice, does indicate that the control of these beetles and the cultural practices need revision (no ratoon rice) if rice yellow mottle appears in this area, where the very susceptible 'Sindano' is the most grown rice variety. At the Ahero Pilot Scheme also some *T. sericea* were caught recently.

D. viridicyanea is known from Congo where it causes damage to rice (Buyckx, 1962).

Grist and Lever (1969) report some *Chaetocnema* spp. which damage rice. At the Ahero Pilot Scheme, *C. pulla* is present in large numbers and the virus disease is spreading there. After the harvest the fields are not tilled immediately, consequently

Fig. 2. Adult beetle *Trichispa sericea*.

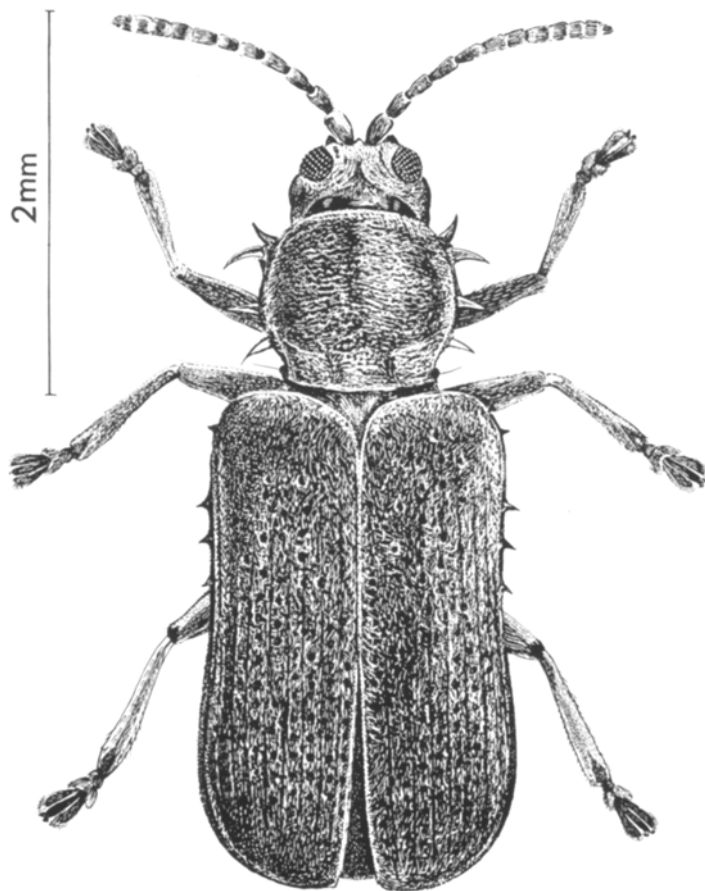


Fig. 2. Volwassen kever *Trichispa sericea*.

Fig. 3. Adult beetle *Dicladispa* (*Chrysispa*) *viridicyanea*.

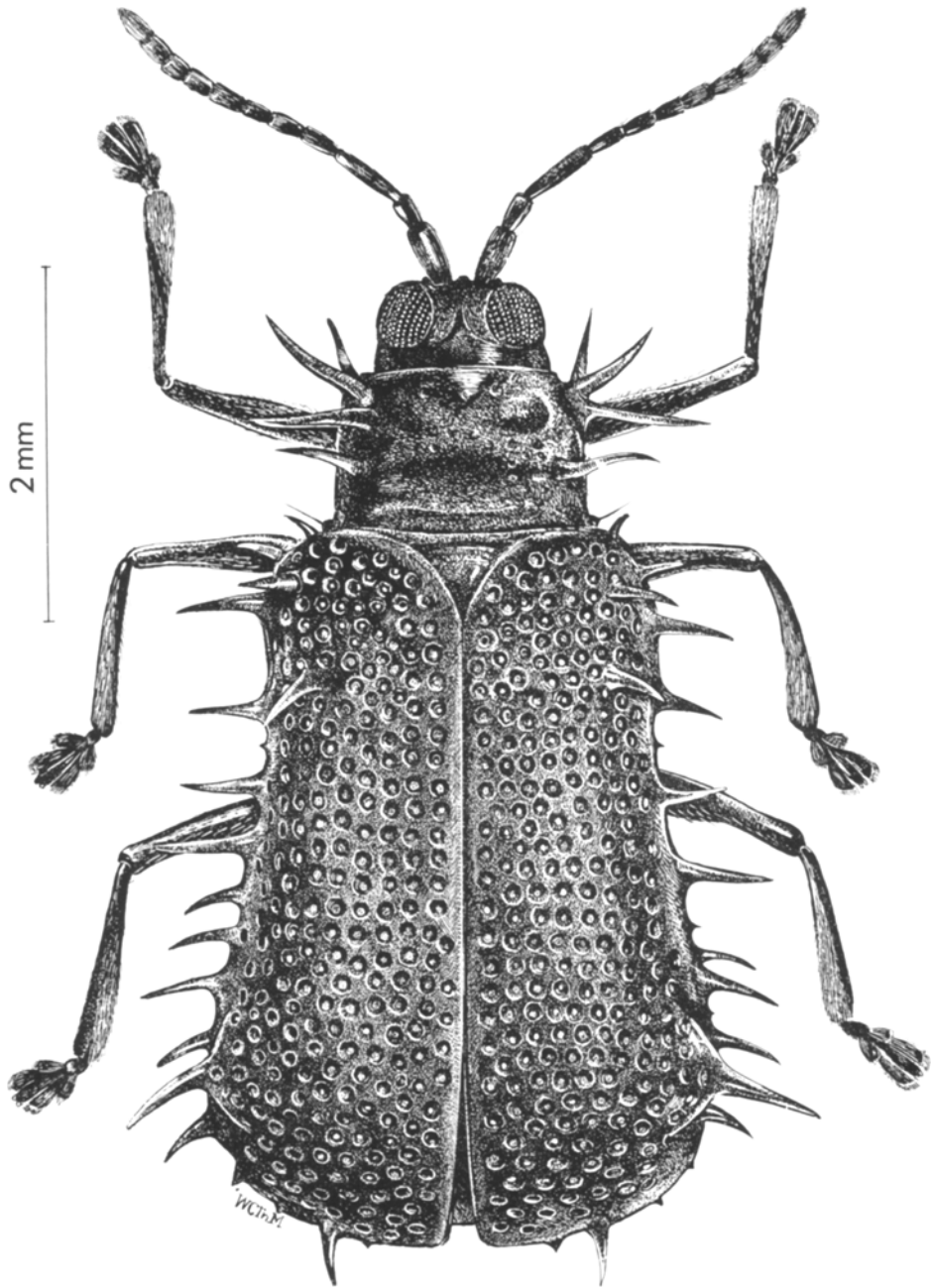


Fig. 3. Volwassen kever *Dicladispa* (*Chrysispa*) *viridicyanea*.

giving ratoon rice and germinated dropped seeds, in some fields with a high incidence of rice yellow mottle. On the bunds grass growth is abundant and *C. pulla* is found also here. This situation provides an efficient source of infection and facilitates a vast spreading of the disease. Improvement of the sanitation situation is here the first and most important requirement. *C. pulla* has been recorded from Mwea too.

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Fig. 4. Feeding damage of rice leaves 'Sindano' by caged adult beetles. Left, facing lower epidermis; right, facing upper epidermis. Damage caused by *Chaetocnema pulla* (A). Damage caused by *Trichispa sericea* (B).

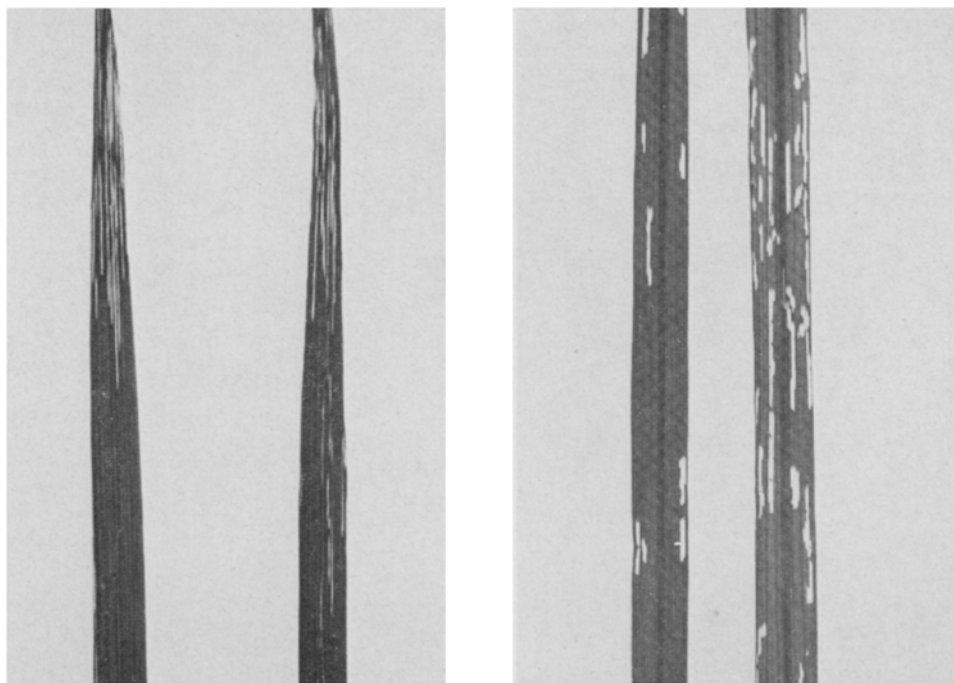


Fig. 4. Vraatschade van gekooide volwassen kevers op rijstblad 'Sindano'. Links, beneden-epidermis naar boven; rechts, boven-epidermis naar boven. Vraatschade veroorzaakt door *Chaetocnema pulla* (A). Vraatschade veroorzaakt door *Trichispa sericea* (B).

Samenvatting

Drie kevers als nieuwe vectoren van 'rice yellow mottle' virus in Kenya

'Rice yellow mottle' virus komt voor in rijst in de omgeving van Kisumu (Nyanza Province) in Kenya. Behalve *Sesselia pusilla* (Bakker, 1970) bleken ook de volwassen kevers *Chaetocnema pulla* Chapuis (Halticinae) (Fig. 1), *Trichispa sericea* (Guérin) (Hispidinae) (Fig. 2) en *Dicladispa (Chrysispa) viridicyanea* (Kraatz) (Hispidinae) (Fig. 3), alle behorend tot de familie Chrysomelidae, in staat te zijn het virus over te brengen (Tabel 1).

Het voorkomen van *T. sericea* en *C. pulla* in het Mwea Irrigation Settlement (Central Province), waar de ziekte nog niet is waargenomen, onderstreept het belang om dit gebied daarvan vrij te houden. In het Ahero Pilot Scheme (Nyanza Province) is de slechte sanitaire toestand – uitgelopen rijststoppels, opslag, hoog gras op de dijkjes en in de sloten – verantwoordelijk voor de uitbreiding van 'rice yellow mottle'. Verbetering in deze toestand is een allereerste vereiste ter bestrijding van de ziekte.

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Address

National Agricultural Laboratories, P.O. Box 30028, Nairobi, Kenya.