

Morphological and physiological differences between *Philanthus triangulum* (Fabricius, 1775), and its African subspecies *abdelcader* Lepeletier de Saint Fargeau, 1845 (Hymenoptera: Sphecidae)

by

TOM PIEK

Department of Pharmacology, University of Amsterdam

ABSTRACT. — The African *Philanthus abdelcader* Lepeletier de Saint Fargeau, 1845 is generally considered to be a synonym of the European *P. triangulum* (Fabricius, 1775). Both populations differ in colour and colour pattern, as well as in behaviour. Moreover marked differences have been described between the action of their venoms. It is suggested to distinguish two subspecies *triangulum* and *abdelcader*.



Fig. 1 — Colour patterns of females of *Philanthus triangulum*. Left colour pattern of the European *P. triangulum*, right that of the African *P. triangulum abdelcader*. The white portions of head, thorax, abdomen and legs are yellow in *P. triangulum* from Europe and orange-yellow in *P. triangulum* from Egypt (ssp. *abdelcader*). Vertical bar represents 1 cm.

The European beewolf *Philanthus triangulum*, originally described by Fabricius (1775) as *Vespa triangulum*, is well characterized by having a yellow gaster with black triangles on every segment (fig. 1, left). Fabre (1891), described the biology of the digger wasp, which he called "Le Philanthe apivore", *Philanthus apivorus* (Latreille, 1799), in the fourth volume of his famous *Souvenirs Entomologiques*.

Although Fabre was the first who clearly demonstrated that most solitary aculeate wasps sting their prey to paralysis and not to death (see Piek, 1986), he was obviously wrong in his conclusion that the sting by his "philanthe apivore" in the neck of the honeybee worker, killed this insect. He might not have known of the observation by Lepeletier de Saint Fargeau (1841), who observed European beewolves to paralyse honeybees. Some years later Lepeletier de Saint Fargeau (1845) also described a new beewolf from Palearctic Africa, which has an orange-yellow abdomen and no black triangles (fig. 1, right), as *P. abdelcader*. Roth (1917)

observed that honeybee workers, stung by *P. abdelcader* from Algeria, were able to sting him in his fingers, when he touched them. Fascinated by this marked contrast to the observations by Fabre, who believed that the bees were dead, he also observed honeybee workers stung by *P. triangulum* from France. These prey only responded weakly with their legs after being stimulated mechanically. Although it was Roth's intention to demonstrate that Fabre was wrong in his conclusion, and he therefore emphasized the similarity in paralysis rather than the difference, he provided the first argument for a possible difference in the composition of the venom between beewolves from Africa and Europe.

In 1980 Piek *et al.* described that the venom of beewolves, collected by R. T. Simonthomas in the Egyptian Dakhla oasis, had a blocking effect on the synaptic transmission of insect muscles, which was markedly different from that described earlier for the venom of European beewolves (Piek *et al.*, 1971).

Recently we have found another difference between the actions of African and European beewolf venoms. Although both venoms contain a glutamatergic channel blocker of low molecular weight, called delta-philanthotoxin (Spanjer *et al.* 1982; Piek, 1982), we have also found two cholinergic antagonists. However, in the venom of the African wasps two different antagonists are present, one competitive and one non-competitive, and in the venom of European wasps only the non-competitive antagonist is present (Piek & Mantel, 1987).

The African *Philanthus* species, described as *abdelcader* is generally considered to be synonymous with the European *P. triangulum* (Girard, 1881; Roth, 1917; Simonthomas & Simonthomas, 1980) African and European beewolves have an important character of behaviour in common. They prey exclusively on honeybee workers, whereas other *Philanthus* species prey on numerous solitary and social bees and wasps (Evans & Lin, 1959; Powell & Chemsak, 1959; Armitage, 1965; Alcock, 1974; Gwynne, 1981; Hilchie, 1982; Evans, 1982). Besides their similarity in choice of prey, the African and European beewolves show a marked difference. In Europe the beewolves catch honeybees which are foraging for nectar on flowers, and in the Egyptian Dakhla oasis they attack honeybees close to the hive, and sometimes on the alighting board in front of the defended hive entrance (Simonthomas & Simonthomas, 1980). In this aspect the African *P. triangulum* behaves like the American *P. crabroniformis* F. Smith (= *P. flavifrons* Cresson) (Bohart, 1954; Alcock, 1974).

It can be concluded that African beewolves differ from European ones in several aspects: (1) their colour and colour patterns (fig. 1) (2) their hunting behaviour, and (3) their venom (in composition and effect).

In their generic revision of the sphecid wasps of the world, Bohart & Menke (1976) have listed *P. triangulum* from Africa as the subspecies *abdelcader* (Lepelletier de Saint Fargeau, 1845). In account of the differences mentioned, I would suggest to adopt this nomenclature for the time being, pending future taxonomic and pharmacological work.

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AMC, Meibergdreef 15, 1105 AZ Amsterdam, The Netherlands.

CUCULLIA LACTUCAE (DENIS & SCHIFFERMÜLLER) (LEPIDOPTERA: NOCTUIDAE). Op p. 59, 1.IV.1986, vermeldde ik deze soort als nieuw voor de Nederlandse fauna. Enige tijd later schreef de heer M. Fibiger (Sorø, Denemarken) me dat de afgebeelde vlinder mogelijk een melaanistisch exemplaar van *Cucullia umbraticae* (Linnaeus) was. Hij kende een identiek exemplaar uit Denemarken. Na controle van het genitaalapparaat bleek hij gelijk te hebben. *C. lactucae* vervalt dus weer als hier waargenomen soort. Met dank aan de heer Fibiger voor zijn opmerking en aan de heer C. Ottenheim voor toestemming voor het maken van het preparaat. Met dat al is zijn exemplaar nog altijd een unicum.

B. J. Lempke, Plantage Middenlaan 64, 1018 DH Amsterdam.