Dolichopodidae (Diptera: Empidoidea)

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The majority of Dolichopodidae species collected on the Brandberg were trapped using light traps as opposed to Malaise traps and yellow pan traps. Eight Brandberg species represent only a small part of the Namibian fauna: *Asyndetus virgatus* Curran, *Campsicnemus caffer* Curran, *Chrysotus inconspicuus* Loew, *Hydrophorus praecox* Lehmann, *Medetera capensis* Curran, *Medetera* sp. nov., *Sympycnus munroi* Curran, *Thrypticus kataevi* Grichanov. They represent seven genera and four subfamilies: Diaphorinae, Hydrophorinae, Medeterinae and Sympycnynae. The numbers of individuals trapped were considerably more numerous in the surrounding Namib plains than on the Brandberg itself. Both recorded species of *Medetera* Fisher von Waldheim were only represented in samples from high altitudes

INTRODUCTION

The known world fauna of Dolichopodidae is very large, with approximately 6500 species in 200 genera. These predominantly predatory flies are distributed throughout the world including the tropics and high-latitude islands.

At present more than 600 afrotropical species are known. Many species described early in the 20th Century were incompletely described, some lacking male descriptions, or were inadequately illustrated. Authors often omitted important characters that are regarded today as having generic level value. For this reason no fewer than 50 species require relegation to synonomy or to be declared *Nomina Dubia* in future revisions of type material. Several hundred species probably await description. The majority of the afrotropical species were described by Th. Becker, C. H. Curran, I. Ya. Grichanov, C. G. Lamb, O. Parent and P. Vanschuytbroeck (Dyte & Smith 1980; Grichanov 1997, 1998a, 1998b, 1998c, 1999 *et op. cit.*).

The fauna of the Congo basin (Kinshasa) may be regarded as well-known, while fragmentary investigations have been undertaken on the fauna of Cameroon, Kenya, Madagascar, Nigeria, South Africa, Tanzania and Uganda. Adjacent African islands and other afrotropical countries have been poorly studied.

Until recently, very little information was available with respect to the Namibian Dolichopodidae. Twenty species were recorded and described in recent reviews of afrotropical genera and subfamilies of the family (Grichanov 1997, 1998a, 1998b, 1998c, 1999 *et op. cit.*). The majority of species have been collected in the central arid part of the country, being xerophilous and halophilous in habit. Some of these species are widely distributed across semi-deserts or maritime territories of the Old World (*Amblypsilopus munroi* (Curran, 1924), *Hydrophorus praecox* Lehmann, 1822, *Tachytrechus tessellatus* (Macquart, 1842), *Thinophilus indigenus* Becker, 1902). The remaining species are regarded as being endemic to Namibia (*Medetera chumakovi* Grichanov, 1997, *Medetera rikhterae* Grichanov, 1997, *Thinophilus munroi setiscutellatus* Grichanov, 1997) or to the southern part of Africa (*Cemocarus griseatus* (Curran, 1926), *Hydrophorus vaalensis* Parent, 1954, *Medetera norlingi* Grichanov, 1997, *Medetera polleti* Grichanov, 1997, *Medetera subchevi* Grichanov, 1997, *Condylostylus imitator* Curran, 1924). Namibia as a whole and north-eastern

parts of the country (Kwando river basin), have a significant tropical element, with many species in common with central Africa or occurring across the continental afrotropics. To date I have examined approximately 50 species of the family from Namibia, some of which represent new taxa, but the real number may reach 100-200 species, following more extensive sampling over a wider geographical area of the country.

Most adult dolichopodids occur on sand, damp ground, grass, leaves, tree trunks, river rocks, and other surfaces near open water. These sites are occupied both for mating and for opportunistic feeding on soft-bodied invertebrates. Adult flies are predaceous on small mites (Acari), Aphidae (Homoptera), Psyllidae (Homoptera), Psocoptera, Thysanoptera, Nematocera (Diptera) and other insects, sometimes playing a regulating rôle in agricultural ecosystems. Most of the numerous species of the cosmopolitan genus *Medetera* Fisher von Waldheim, 1819, are associated with tree trunks, especially in boreal forests of the Holarctic Region, where their larvae are predacious on bark-beetles (Coleoptera) and other insects including pests of trees. Imagoes of many *Medetera* species may be encountered in montane regions on large stones and rocks covered by mosses and lichen and in semi-desert regions in and around rodent burrows and other ground cavities. Many species of Dolichopodidae may be collected by use of Malaise and light traps, or by sweeping vegetation with a net. Larvae of almost all species studied are predators, inhabiting moist substrata. The smaller species may be saprophagous in the larval stage. Species of a single genus (*Thrypticus* Gerstaecker, 1864) are known to be phytophagous, living within the stems of cereal grasses (Poaceae).

There are no published accounts of altitudinal zonation of montane territories for Dolichopodidae. My observations of the fauna of the Caucasus and Tyan Shan Mountain ranges have revealed that species diversity increases from 1500 to 2000 m in comparison with the surrounding steppe and desert plains. However, the number of species decreases in the alpine zone at a height of more than 3000 m, although some species may be most abundant on alpine meadows and swamps. The low Polar and North Ural Mountains exhibit a significant decrease in species diversity at heights of 500-800 m, as compared to the adjacent tundra plain.

RESULTS AND ANALYSIS

The majority of Dolichopodidae species collected on the Brandberg were trapped in light traps (seven species) as compared to Malaise traps (three species) and yellow pan traps (one species). One of the light traps, situated near a spring, was especially rich, with 188 specimens representing five species, although only one species (*Hydrophorus praecox*) was significantly abundant. In this case, the light trap was situated in a sparsely vegetated river valley at a height of 700 m. The other trap samples were not significantly numerous. Only one specimen was collected with a yellow pan trap.

Eight Brandberg species represent only a small fraction of the Namibian fauna. They comprise seven dolichopodid genera in four subfamilies *viz.* Diaphorinae, Hydrophorinae, Medeterinae and Sympycnynae. The actual number of species may be at least three times as high. For example, occasional trapping at Ugab River, 2 km W of Brandberg Wes with a Malaise trap yielded a further three species belonging to an additional two genera of the family (*Micromorphus* sp. and *Cryptophleps* sp.).

Two new species were discovered in samples from the Brandberg Pilot Study. They are not endemic to the mountain and shall be described elsewhere.

It was shown experimentally that trap samples were considerably more numerous in the surrounding Namib plains (Messum River/Valley,

Ugab River sites), than on the Brandberg itself. A single three day trapping event at the Ugab River generated 37 specimens of four species, one of which (one female of *Asyndetus virgatus* Curran, 1926) was also trapped at a height 1180 m. One hundred and ninety specimens of five species were found in a long-term trapping event from Messum Valley (700 m) and only 23 specimens of three species at high altitudes (1950-2470 m). It is interesting to note, that both species of *Medetera* (known also from South Africa) were absent from trap samples from the surrounding Namib plains. *Hydrophorus praecox* was trapped at four altitude levels (from 700 m to 2470 m), but this is not surprising, as the species is considered to be ubiquitous, inhabiting various water impoundments, springs on plains, in alpine zones and along sea coasts throughout the world (with the possible exception of the Americas). This species is now known from many localities in Namibia and is pan-African.

DISCUSSION

The small number of effective sampling events during the first stage of the Brandberg survey does not allow any reasonable conclusions to be drawn, with respect to species dominance or altitudinal zonation.

Dolichopodidae inhabiting arid territories are known to represent ephemeral elements of native faunas, strongly dependent upon precipitation and duration of the rainy season. They disperse, with a more or less even density of population, immediately following heavy showers, often aggregating in great numbers around small rivulets and ephemeral pools several days or weeks later, when the ground is becoming dry. Such ephemeral pools could be the reason for unusually high catches of flies from 22 to 24 October 1998 at Ugab River and on 3 April 1999 at Messum Valley. Placing a trap 1-3 m outside a pool margin might significantly alter the number of flies trapped. The Brandberg is characterised by temporary to semi-permanent ephemeral pools on granite slabs, or in ephemeral riverbeds. Such habitats may well provide suitable breeding areas for Dolichopodidae following heavy precipitation. The Ugab River sites are a quite different habitat from even the lower slopes of the Brandberg Massif. The Ugab River, though ephemeral in nature, is considerably more and differently vegetated than the Hungorob ravine, and has a series of permanent springs, which would obviously greatly effect species richness.

The presence of two species of the xerophilous genus *Medetera*, in six samples from high altitudes, is very interesting. The subfamily Medeterinae is the most diverse in southern Africa, in contrast to the Sciapodinae with its great number of species in central Africa. Species of *Medetera* are the most important dolichopodid element in arid biomes within Namibia and I suspect that further investigation of the Brandberg Massif shall reveal at least 10 further species of the genus.

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