

Worth mentioning is a "Siberian" species, *Leucorhina pectoralis*, which is protected and at present in Poland redlisted as 'Indeterminate' (ŁABĘDZKI et al., 1999). This species is not typical for the kind of reservoirs studied and its occurrence can be judged as accidental.

References – ASKEW, R.R., 1988, *The dragonflies of Europe*. Harley Books, Colchester; – BERNARD, R., 1996, *Roczn. nauk. pol. Tow. Ochr. Przyr. „Salamandra”* 1: 157-166; – 1997, *Notul. odonotol.* 4(10): 159-160; – BUCZYŃSKI, P., 1995, *Wiad. ent.* 14(2): 76-83; – 1997, *Parki nar. Rz. przyr.* 16(2): 41-62; – 1998, *Abstr. Pap. Ist. natn. Symp. Odonatol.*, Bromierzyk, pp. 7-9; – 2000, *Acta hydrobiol.*, Kraków 41: 219-230; – BUCZYŃSKI, P. & S. CZACHOROWSKI 1999, *Wiad. ent.* 18(1): 56; – CZEKAJ, A., 1994, *Notul. odonotol.* 4(4): 53; – D'AGUILAR, J. & J.-L. DOMMANGET, 1998, *Guide des libellules d'Europe et d'Afrique du Nord*. Delachaux & Niestlé, Lausanne-Paris; – DRESCHER, E., 1928, *Das Gebiet Ellguth Kreis Grottkau O/S*. 1: *Flora und Fauna des Bässers*. Bäte, Neisse; – HEIDEMANN, H. &

R. SEIDENBUSCH, 1993, *Die Libellenlarven Deutschlands und Frankreichs*. Erna Bauer, Kelttern; – JACOB, U., 1969, *Faun. Abh. Mus. Tierk. Dresden* (A) 24(2): 197-239; – JÖDICKE, R., 1999, *Libellula* 18(1/2): 31-48; – KRÜGER, L., 1925, *Abh. Ber. pomm. naturf. Ges.* 6: 53-106; – LA BAUME, W., 1908, *Schr. naturf. Ges. Danzig* 12: 75-83; – LE ROI, O., 1911, *Schr. Pflanz.-ökon. Ges. Königsberg* 52: 13-30; – ŁABĘDZKI, A., P. BUCZYŃSKI & G. TONCZYK, 1999, *in: L. Buchholz & J. Nowacki*, [Eds.], *Ochrona owadów w Polsce, u progu integracji z Unią Europejską*, pp. 21-23, Kraków; – LEMPERT, J., 1997, *Libellula* 16(3/4): 143-168; – MIELEWCZYK, S., 1972, *Fragm. faun.* 18(8): 141-162; – 1998, *Roczn. nauk. pol. Tow. Ochr. Przyr. „Salamandra”* 2: 108-118; – PANFIL, J., 1985, *Pojezdzenie Mazurskie*, Wiedza Powszechna, Warszawa; – TONCZYK, G., 1998, *Abstr. Pap. Ist. natn. Symp. Odonatol.*, Bromierzyk, pp. 14-17; – URBANŃSKI, J., 1948, *Annls Univ. M. Curie-Skłodowska* 3(11): 289-311.

Received January 22, 2000

ODONATA FROM KIBALE NATIONAL PARK, WESTERN UGANDA

K.-D.B. DIJKSTRA and N.J. DINGEMANSE
Gortestraat 11, NL-2311 MS Leiden, The Netherlands; – e-mail: dijkstra@naturalis.nm.nl

"... where there is a gleam of filtered sunshine ... it is a fine sight to see the spasmodic flickering of purple iridescence from their gauzy wings."
Elliot Pinhey (1961) describing the habit of *Umma saphirina*

Abstract – Records for 47 spp. collected from Oct. 1995 to Febr. 1996 in Kibale National Park and its surroundings are presented. Notes on habitat, behaviour and taxonomy are added for some spp.

Introduction

From October 1995 to February 1996 a small collection of dragonflies was assembled in western Uganda, principally around the Makerere University Biological Field Station (M.U.B.F.S.) in Kibale National Park near Fort Portal (Kabarole District). The station borders both primary and secondary moist evergreen forest. This lies at an average altitude of 1500 m

dinata pseudodoxia, based (partially) on material from Kibale Forest. All of them were also recorded in the present study.

See DIJKSTRA & DINGEMANSE (1999) for a more general impression of the forest and its dragonfly fauna.

Localities

Kibale National Park
(Kn) M.U.B.F.S. at Kanyawara and the adjacent forest (0°35'N 30°20'E). The area lies 15 km SW of Fort Portal. 9

October 1995 – 27 January 1996.
(Du) Dura River where the south-eastern road out of Fort Portal crosses it (0°25'N 30°20'E). The river was very much swollen during our visit. It is surrounded by lush jungle. 3 November 1995.

(Ng) Field station at Ngogo in the middle of the park (0°30'N 30°25'E). 12 km SE of Kanyawara. 3 February 1996.
(Kt) (Mb) (Nk) Lakes Katanda, Mbajo and Nkuruba (0°25'N 30°15'E). All are crater lakes W of Kibale NP. They are generally deep and are surrounded with steep, forest-covered slopes. Nk: 30 October 1995, Kt & Mb: 21 January 1996.

(Sa) Lake Saka (0°40'N 30°15'E). A very open crater lake, N of Fort Portal. It is surrounded by agricultural land and has shores with dense reeds and rushes. 2 December 1995.

(Mp) Mpanga River SE of Kibale NP (0°15'N 30°30'E). A fairly broad lowland river, flanked by acacias, in savannah. 15 December 1995.

Other parts of western Uganda
(Ky) Kyambura (Chambura) Gorge near Fig Tree Camp in Queen Elisabeth National Park (0°10'S 30°05'E). This is a deep, lushly forested gorge through savannah. 2-6 January 1996.

(Se) Savannah on the eastern edge of Semliki National Park (0°50'N 30°05'E). On the road from Fort Portal to Bundibugyo. 12 February 1996.

List of recorded species
For each species collected specimens are listed.

Species identified otherwise are only given by locality. The material is in the collection of the senior author.

Coleopterygidae

– *Phaon iridipennis* (Burm.): (Mp) (Se).
– *Umma saphirina* Förster: (Kn) 2♂, 1♀.

Common on forest streams. Territorial males are very aggressive, also towards *Chlorocypha trifaria* males. Young individuals and females were commonly seen on sunny patches throughout the forest. Tandems were also seen far from water.

Chlorocyphidae

– *Chlorocypha curta* (Hag.): (Se).
– *Chlorocypha tenuis* Longfield: (Kn) 1♂.
Occurs in the same habitat as the next species, but less common.

– *Chlorocypha trifaria* (Karsch): (Kn) 2♂, 2♀. Common on gravel-bottomed forest streams.

– *Platycypha lacustris* (Förster): (Du) 1♂, 1♀.
Protoneuridae

– *Chlorocnemis marshalli superba* Schmidt: (Kn) 2♂, 2♀. Fairly common on clear forest streams, either with sand or gravel. Oviposits in tandem into roots protruding out of water.

– *Chlorocnemis pauli* Longfield: (Kn) 1♂.
Seen twice in dense, wet vegetation, once near a stagnant pool, the other time near a gravel-bottomed stream.

Coenagrionidae

– *Agrionemis gratiosa* Gerstaecker: (Sa) 1♀.
– *Ceragrion glabrum* (Burm.): (Kn) 2♂.

– *Enallagma pseudelongatum* Longfield: (Kn) 2♂, 1♀. Fairly common at small, sheltered standing waters in the forest. Oviposition in tandem on the underside of floating fallen leaves.

– *Enallagma longfieldae* Fraser: (Ky) 1♀.
– Pinhey (1984) treats this as a subspecies of *Enallagma vaginiale* Sjöstedt, 1917.

– *Enallagma nigridorsum* Sel.: (Kt) 1♂.
– *Enallagma subfurcatum* Sel.: (Kn) 1♂, 1♀.

– *Pseudagrion hageni tropicum* Pinhey: (Kn) 1♀. Oviposition seen without male, in decaying leaves in somewhat muddy streams.

– *Pseudagrion kersteni* (Gierst.): (Kn) 1♀.
– *Pseudagrion kibalense* Longfield: (Kn) 2♂.

Fairly common on forest streams. Female oviposits without male or in tandem, into roots protruding out of water.

- *Pseudagrion massaicum* Sjöst.: (Nk) 2♂, 1♀.

- *Pseudagrion spermaticum* Sel.: (Mp) 1♂.

A e s h i d a e

- *Aeshna e. ellipti* Kirby: (Kn) 1♂, 1♀.

Commonly seen hunting along roads through the forest.

- *Anax imperator mauricianus* Ramb.: (Kn) (Nk) (Sa) (Kt) (Mb).

- *Gynacantha bullata* Karsch: (Kn) 1♂.

- *Gynacantha vesiculata* Karsch: (Kn) 1♂.

G o m p h i d a e

- *Ictinogomphus ferox* (Ramb.): (Nk) 1 exuvia; (Sa) 1♂, 1 exuvia.

- *Notogomphus butoloensis* Fraser: (Du) 1♂, 1♀, 1 exuvia; (Ky) 1♀. Was found emerging from torrential water of the river, which was swollen by heavy rains. This species was mentioned by DIJKSTRA & DINGEMANSE (1999) as *N. levoyi*, but based on information supplied by PINHEY (1961, 1969) it is clear that *N. butoloensis* was concerned.

M a c r o m i d a e

- *Phyllomacromia picta* (Hag.): (Kn) 1♂.

L i b e l l u l i d a e

- *Atoconeura biordinata pseudedeutoxia* LONGFIELD: (Kn) 1♂; (Ng) 1♀. Males were seen over streams. The collected male fits the description of the subspecies perfectly. LONGFIELD (1953) did not describe the female, but it could be expected to be similar to that of *Atoconeura eudoxia* (Kirby). The collected female is relatively large (hind wing 37 mm) and has the facial markings typical of *A. b. pseudedeutoxia*. The paraprocts are densely haired and the cerci are long, similar to *A. b. biordinata* Karsch, but unlike *A. eudoxia*. It is therefore assumed that the specimen is a female of *A. b. pseudedeutoxia*.

- *Brachythemis leucosticta* (Burma.): (Nk) (Sa) (Mb) (Ky) 1♂.

- *Crocothemis sanguinolenta* (Burma.): (Kn) 1♂; (Ky) 2♂.

- *Hemistigma albipuncta* (Ramb.): (Kn) 1♂, 3♀; (Ky) 1♂. At Kanyawara the species did not appear before the second half of

January, suggesting it might be seasonal here.

- *Micromacromia camerunica* Karsch: (Kn) 1♂, 1♀. Fairly common on clear forest streams. A female was seen throwing itself into the water.

- *Nesiothemis farinosa* (Förster): (Nk) 4♂, 1♀; (Mp) 1♀.

- *Nothothemis robertsi* Fraser: (Kn) 1♂. More common than the similar *Micromacromia camerunica* and sometimes found with it.

Prefers slower, more muddy and, often, very small bodies of waters. Males make inspection flights, but are easily disturbed, flying up into the canopy. Female seen ovipositing unguarded, hovering while frequently but slowly dipping the tip of the abdomen into the water. According to CLAUDSNIETZER & LEMPET (1998) the species oviposits epiphytically.

- *Orithetrum austeni* (Kirby): (Nk) 1♂ (Kt).

- *Orithetrum caffrum* (Burma.): (Kn) 1♂, 2♀.

- *Orithetrum julia* Kirby: (Kn) 6♂, 4♀.

Material from Uganda is difficult to assign either to the nominate subspecies or to *fallsum* Longfield. The country appears to lie in the transition between the two (LONGFIELD, 1955; PINHEY, 1970). This was the most common dragonfly in the forest. It oviposits in all water types, from clear streams to murky pools. Males are often seen guarding the ovipositing female. Copulation lasts less than half a minute.

- *Orithetrum trinacria* (Sel.): (Ky) 1♂.

- *Palpopleura lucia* (Dru.): (Kn) 1♂, 1♀.

- *Pantala flavescens* (Fabr.): (Kn) 1♂, 1♀.

- *Parazyxomma flavicans* (Martin): (Nk) 1♀.

- *Tramea basilaris* (P. de Beauv.): (Kn) 1♂.

- *Trithemis annulata* (P. de Beauv.): (Nk) 1♂ (Sa).

- *Trithemis arteriosa* (Burma.): (Mb) 1♂.

- *Trithemis kirbyi ardens* Gerst.: (Kn) 1♂.

- *Trithemis nuptialis* Karsch: (Mp) 1♂.

- *Urothemis assignata* (Sel.): (Kt).

- *Zygonyx regisalberit* (Schouteden): (Ky). A

large dragonfly with a conspicuous pale ring around the seventh abdominal segment had wing markings perfectly matching those illustrated by FRASER (1957) and PINHEY (1964). It flew at a height of four

or five metres, in a small group of dragonflies above the edge of the gorge. The dragonflies glided to and fro, remaining high. The accompanying individuals were similarly sized, had clear wings and some were seen to possess a similar abdominal ring. It is possible that these were conspecific males. GRAVES (1999) reports the species from Maramambo Forest, also in Queen Elisabeth National Park.

D i s c u s s i o n

Kibale Forest is part of the rain forest belt that extends East of the Albertine Rift to the North of Lake Victoria, ending in western Kenya. This area has been relatively well studied. MILLER (1993, 1995) describes the faunas of Budongo Forest and several forests around Kampala, Uganda. CLAUDSNIETZER (in press) presents data from Kakamega Forest, Kenya. Based on the current information, a fair impression of the characteristic forest fauna of this region can be sketched. The streams are typified by *Umma saphirina* and other damselflies like *Chlorocypha tenuis*, *C. trifaria* and *Pseudagrion hageni tropicanum*. *Micromacromia camerunica* is the characteristic tetrathemistine dragonfly of this habitat. Pools are usually inhabited by *Nothothemis robertsi* and the abundant *Orithetrum julia*. Among the aeshnids, *Aeshna e. ellipti* and *Gynacantha bullata* are common.

T H E O D O N A T A O F M A C A O , S O U T H E R N C H I N A

E.R. EASTON¹ and G.-Q. LIANG²

¹ Formerly at University of Macao. - current address: 46-130 Kiowai Street No. 2714, Kamcohe, Hawaii 96744, United States

² Research Institute of Entomology, Zhongshan University, Guangzhou-510275, China

Abstract - 27 spp. are listed, of which 25 (asterisked) are considered new records for this new administrative region of China. *Cercion sexlineatum* (Sel.), *Sinictinogomphus clavatus* (Fabr.) and *Anax parthenope julius* Br. were attracted to lights.

I n t r o d u c t i o n

This is the first account regarding the dragonflies and damselflies of Macao. The flora and fauna are similar to that of the Hong Kong area.

Notogomphus butoloensis appears to be the most widespread forest-river gomphid in this zone. On the outskirts, the forest is invaded by ubiquists such as *Palpopleura lucia* and *Pantala flavescens*.

References - CHAPMAN, C.A., L.J. CHAPMAN, R. WRANGHAM, G. ISABIRYE-BASUTA & K. BEN-DAVID, 1997. *Afr. J. Ecol.* 35: 287-302; - CLAUDSNIETZER, V. [in press], *J. E. Africa nat. Hist. Soc.*; - CLAUDSNIETZER, V. & J. LEMPET, 1998. *J. afr. Zool.* 112(2): 101-107; - DIJKSTRA, K.-D.B. & N.J. DINGEMANSE, 1999. *WDA's Agrion* 3(1): 13. FRASER, F.C., 1957. *Revue Zool. Bot. afr.* 55(3/4): 338-346; - GRAVISE, T., 1999. *WDA's Agrion* 3(1): 15-16; - LONGFIELD, C.E., 1936. *Trans. R. ent. Soc. Lond.* 85(20): 467-498; 1953. *Entomologist* 86(2): 42-49; 1955. *Publicatões cult. Co. Diam. Angola* 45: 13-1959. *Publicatões cult. Co. Diam. Angola* 45: 13-42; - MILLER, P.L., 1993. *Opusc. Zool. Jhuin.* 102: 1-12; - 1995. *ibidem* 136: 1-19; - PINHEY, E.C.G., 1961. *A survey of the dragonflies (order Odonata) of eastern Africa*. Br. Mus., London: 1964. *Publicatões cult. Co. Diam. Angola* 63: 95-130; - 1969. *Occ. Pap. natn. Mus. Rhod.* (B) 4(28): 137-207; - 1970. *ibidem* 4(30): 261-321; - 1984. *Smithersia* 3: 1-64.

Received January 26, 2000

with the exception that the land area of Macao is considerably smaller, approximately 25 km², which results in fewer number of species. The land area of Hong Kong consisting of more than 1000 km² results in a greater number of habitats for insects and the number of species of Odonata exceeds 100.

An aerial net was employed to collect dragonflies and damselflies on the wing throughout the area of Macao with emphasis on the island areas of Taipa and Coloane. Sampling was cur-