

SOME DRAGONFLY RECORDS FROM PHEWA TAL, POKHARA, NEPAL WITH NOTES ON *PHILOGANGA MONTANA* (SELYS) (ZYGOPTERA: AMPHIPTERYGIDAE).

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Abstract — Of the 20 spp. observed at Phewa Tal, Pokhara, *Gomphidia t-nigrum* Sel. is recorded for the first time from Nepal. *Philoganga montana* appears to be an exclusively arboreal insect during the adult stage.

Introduction

The Pokhara valley situated in central Nepal, approx. 200 km W of Kathmandu, lies at an average altitude of 800 m and enjoys a pleasant sub-tropical climate with temperatures ranging between 15-26°C. The annual precipitation is 4100 mm, almost twice that of Kathmandu. The region, regarded as the Nepalese lake district, has half a dozen lakes within the area, the largest of which is Phewa Tal at 3 km long. Pokhara, the third largest town in Nepal, lies on its northern shore. The south side of the lake however lies adjacent to extensive woodland which reaches down to the shore line. The Pokhara valley sports a wonderful 140 km wide panorama of the central Himalayan chain with several peaks between 7000 and 8000 m high and is a major starting point for many mountain treks.

VICK (1989) provides a fairly up to date

overview of the odonatological research conducted in Nepal and provides a species check-list and detailed bibliography covering the period from 1854 to 1988. Although numerous small collections have been made, the most significant collection of Nepalese Odonata was made by the lepidopterist, Colin Smith during the 1980's and it was his discovery of *Philoganga montana* (Sel.) at Phewa Tal in 1981 that prompted this short visit.

Between the 22nd May and 27th May, 2000, dragonfly observations were made at the south-east end of the lake in the vicinity of the Fish Tail Lodge Hotel complex. Here the lake is virtually devoid of any emergent or floating aquatic vegetation and woodland comes to and overhangs the shore. The water level, controlled by the near-by dam, appears to fluctuate significantly and at the time was sufficiently low to have exposed 4m + of rocky shore providing easy access to the lake margin.

List of species

A m p h i p t e r i g i d a e

— *Philoganga montana* (Sel.): ♂, ♀, exuviae

C a l o p t e r y g i d a e

– *Vestalis g. gracilis* (Ramb.): ♂, ♀, exuviae

Chlorocyphidae

– *Libellago l. lineata* (Burm.): ♂, ♀

Coenagrionidae

– *Pseudagrion bengalense* Laidl.: ♂, ♀

– *Ceriagrion cerinomeles* Lieft.: ♂, ♀

Platycnemididae

– *Calicnemia nepalica* Kimm.: ♂, ♀

– *C. pulverulans* (Sel.): ♂

Protoneuridae

– *Prodasineura autumnalis* (Fr.): ♂, ♀

Gomphidae

– *Burmagomphus hasmaricus* Fr.: ♂

– *Ictinogomphus rapax* (Ramb.): ♂, ♀, exuviae

– *Gomphidia t-nigrum* Sel.: ♂, ♀, exuviae

Corduliidae

– *Epopthalmia f. frontalis* Sel.: ♂, ♀, exuviae

– *Macromia flavocolorata* Fr.: ♂, ♀, exuviae

Libellulidae

– *Brachythemis contaminata* (Fabr.): ♂, ♀

– *Crocothemis erythraea* (Brullé): ♂, ♀

– *Neurothemis fulvia* (Dru.): ♂, ♀

– *Diplacodes trivialis* (Ramb.): ♂

– *Orthetrum sabina* (Dru.): ♂

– *O. taeniolum* (Schneider): ♂

– *Trithemis aurora* (Burm.): ♂, ♀

Notes and observations on individual species

Calicnemia nepalica and *C. pulverulans* were the only two species not directly associated with the lake. Both were found inhabiting a tiny fast-flowing, rocky stream that passed through the woodland close to the lake. Individuals were seen perched on low vegetation growing close to or within the stream bed, often in shady situations.

Epopthalmia f. frontalis was particularly common. Seen patrolling the lake margin approx. 1 to 2 m from the waters edge. Numerous exuviae were collected from vertical rock faces and tree trunks sometimes to a height of 4-5 m above the water. Emergence was observed on several occasions early in the morning.

Macromia flavocolorata was frequently seen patrolling very close to the waters edge and often mistaken for *Ictinogomphus rapax* with which it regularly flew. Females oviposit close to the waters edge with a fast intermittent dipping of the abdomen, lasting approx. 2-4 s, before moving on. Exuviae were collected approx. 1 m above the water on vertical rock faces behind overhanging

vegetation. Exuviae of another *Macromia*, probably *M. moorei* Sel., were also frequently found.

Gomphidia t-nigrum was only encountered in one small area between the Fish Tail Lodge Hotel and the dam, where the lake narrows considerably. Adults were seen frequently perched on boulders and concrete blocks, their bright blue eyes making field identification relatively easy. Known from northern India, this is the first record for Nepal.

Very little is known about the natural history of *Philoganga montana*. FRASER (1934) noted that the insect was taken in moderate numbers at Shillong, Khasi Hills, N. India, at two restricted localities that bordered montane streams. They were taken at rest on bushes with the wings spread horizontally. There does not appear to be any other comments on the habits/behaviour of this species. C. Smith (pers. comm.) confirmed that his collections were made close to the lake at Pokhara, but could not offer further information.

Armed with only the barest of facts, fast-flowing feeder streams in woodland appeared to be the logical place to look for potential breeding sites for this insect and a great deal of time was spent doing just that. Small streams were searched for both adults and larvae and it was with great disappointment that very little odonate material was found at all. Whilst walking along the lake shore about mid-day on 23rd May, the senior author noticed two males, in conflict with each other, briefly flying approx. 3 m above the shore close to the waters edge. Within seconds they had flown onto an adjacent tree out of sight.

Another woodland stream was searched farther round the lake but again no *Philoganga* were found. At this point it was decided to return to the initial sighting and search the lakeside trees and shrubs with the aid of binoculars.

Within a few minutes of reaching the initial site it was with considerable amazement that a female was spotted ovipositing within the bark of a tree branch (approx. 1 cm diam.; Fig. 1) that overhung the water line at a height of approx. 5 m above the shore. A male was observed perched approx. 4 cm below the female on the same branch. Oviposition continued down the branch for 35 min. and during this time the male remained in attendance except for three, brief, short flights on to adjacent branches. He returned each time to perch next to the female. Three other males were observed settled on exposed

branches elsewhere on the same tree.

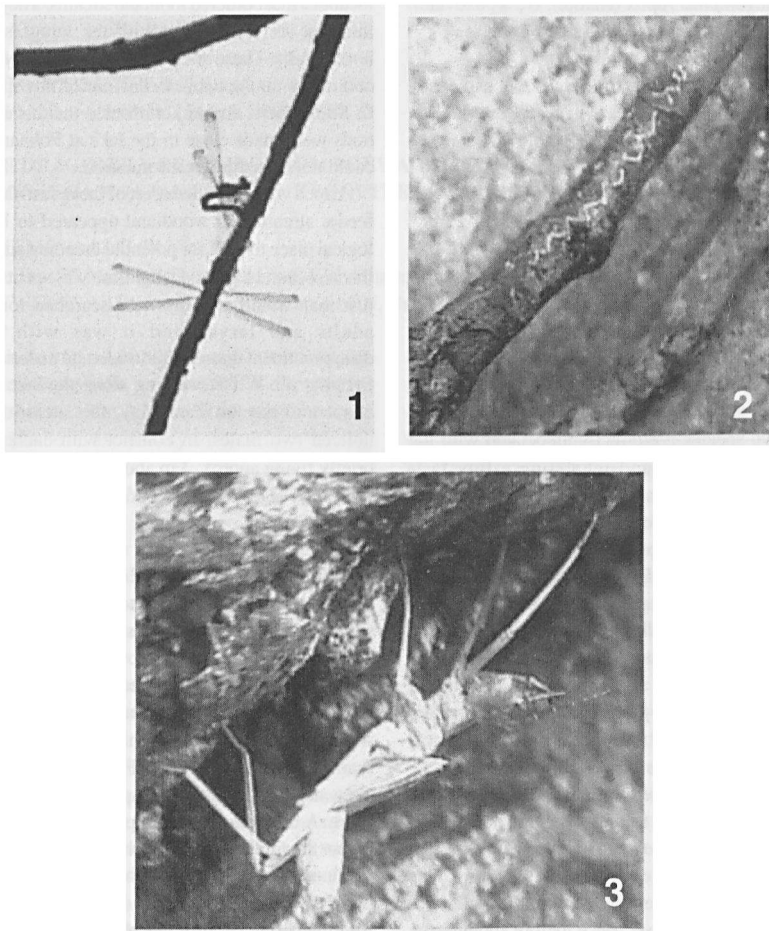
With some difficulty it was eventually possible to obtain the branch in which the eggs were laid (Fig. 2). Three separate zigzag lines running for a distance of 15 cm could be clearly seen, two approx. 5 cm long near the tip of the branch and another 7 cm in length closer to the base.

Observation through a hand lens failed to find any exposed eggs, however it was clear the lines had been formed by the ovipositor cutting the bark surface. The branch was taken for subsequent observation.

Having witnessed the above, a great deal of

attention was paid to lakeside trees over the remaining few days. Oviposition was observed on three further occasions, each time with a male in attendance guarding the female. Other males were observed closeby and if one flew or perched too close to the guarding male he would chase the intruder off. During this manoeuvre brief physical contact with the intruder, lasting less than a second, was observed on one occasion.

On the afternoon (3.00 p.m.) of 26th May a tandem pair was seen first perched on, then flying close to, a bare, drooping branch (approx. 1 cm in diameter) at a height of approx. 12 m above the



Figs 1-3. *Philoganga montana* (Sel.), Phewa Tal, Pokhara, Nepal (May 2000): (1) oviposition with male guarding; — (2) incisions made during oviposition; — (3) exuviae.

surface of the lake, in the grounds of the Fish Tail Lodge Hotel. Within seconds the flying pair were intercepted by another male. The tandem, led by the male, gave chase to the intruder before they returned to settle on the branch. Copulation then took place and lasted 2 min. before the pair disengaged. The female immediately began ovipositing into the branch. The guarding male perched within a few centimetres of the female and apart from chasing a passing male, only left her on two occasions to perch nearby. The longest departure lasted 2 min. In total the female continuously oviposited for 42 min. and only departed with the onset of heavy rain. During this period three separate males were seen perched nearby and five minutes afterwards another tandem pair was observed in the rain. Two females were seen shortly after the onset of rain descending to shelter in dense vegetation. It is interesting to note that male to male interactions seen at this time often resulted in the intruding male flying away with the abdomen turned down rather like the mating refusal posture adopted by females elsewhere within the Order.

It was clear from our observations that mature *Philoganga* adults prefer to congregate in trees that overhang the water surface, especially on promontories. Few were seen away from such positions.

A search for larvae within the lake sadly proved fruitless, however a total of 23 exuviae (Fig. 3) were found on exposed rock faces to a height of 3.5 m, or under bankside rock ledges and concealed amongst vegetation to a height of 2.5 m.

Discussion

The discovery of *P. montana* breeding on Phewa lake was initially unexpected after the comments of FRASER (1934). However, in view of the fact that the lake is essentially a regulated river controlled by a dam and also the lack of Odonata recording in Nepal generally, we may well be

looking at a slightly atypical breeding site. Clearly the species requires woodland and the powerful, well developed ovipositor of the female is well adapted to oviposition within tree bark or other tough plant material.

It is interesting to note that WILSON (1995), referring to a close relative, *P. vetusta* (Ris), from Hong Kong, tells us that the adults of this species, "frequent woodland associated with fast flowing streams. Males patrol streams and rivers several feet above the water surface, frequently settling in the canopy of adjacent riparian woodland. Adults begin to roost in woodland trees about one hour before dusk".

To summarise *P. montana* does not appear to be particularly active over water itself preferring to remain on or about trees in which all reproductive and oviposition behaviour takes place. Flight is fairly slow and rarely sustained, adults preferring to perch gomphid-like on bare stems and branches. It is also remarkable that the prolarva may have to fall a considerable distance before reaching the water surface. Judging from the condition of the adults and exuvia seen, adults probably emerge in late April and extend into June.

The status and distribution of *P. montana* in Nepal is unknown and requires further investigation.

References — FRASER, F.C., 1934, *The fauna of British India including Ceylon and Burma: Odonata*, Vol.2. Taylor & Francis, London, pp. 112-116; — VICK, G.S., 1989, *Opusc. zool. flumin.* 43: 1-21; — WILSON, K.D.P., 1995, *Hong Kong dragonflies*, Urban Council Hong Kong, pp. 36-38.

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