SOME ASPECTS OF THE ECOLOGY AND BIOLOGY OF *BARBUS CUMINGI* GÜNTHER AND *B. NIGROFASCIATUS* GÜNTHER (PISCES, CYPRINIDAE), TWO CARPLETS ENDEMIC TO SRI LANKA.

by

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1.0 SUMMARY

The following aspects of the ecology and biology of *B. cumingi* and *B. nigrofasciatus* were studied in the upper Mahaweli river system: (i) geographic distribution, (ii) characters of taxonomic importance, (iii) feeding biology and ecology and (iv) reproductive biology and ecology.

Distribution was studied by examining important streams and tributaries as well as the main river from Hatton area (elevation about 1,200 m) to Mahiyangana area (65 m). Both species were observed from Watawala (915 m) to Minipe (105 m), a distance of about 116 km. However, beyond Peradeniya (440 m), they were not observed regularly either spatially or temporally. Both species were often found together below the flood level in shallow streams with a moderate water flow. *B. nigrofasciatus* was common in streams with submerged macrophytes such as *Elodea canadensis*. Of the two varieties of *B. cumingi*, namely, the orange fin- and yellow fin-varieties, only the former was found in Mahaweli. Both species appear to have been introduced by man into the Mahaweli river system relatively recently.

Morphometry, feeding biology and reproductive biology of the two species were studied in a small stream (7° 1'N, 80° 29'E) at an elevation of about 600 m in the village of Ambagamuwa on the Nawalapitiya-Ginigathena road. Both species are herbivorous substratum feeders and their diet consists mainly of diatoms and detritus. Detritus was the most important food item in the diet of *B. cumingi* but both items were of equal importance as food for *B. nigrofasciatus*.

The relative abundance of detritus and diatoms varied somewhat from month to month, but the relative abundance of both taken together remained almost constant throughout the year. In both species, the importance of diatoms increased with the increase in body size whereas that of diatoms decreased with the increase in body size.

The intestinal contents of *B. cumingi* contained a higher percentage of diatoms in comparison to that of stomach contents, whereas in *B. nigrofasciatus*, the percentages of both diatoms and detritus were low in the intestine indicating differences in the digestion in the stomach of the two species.

In laboratory experiments, both species fed well on filamentous green algae when the diatom frequency was low. In such experiments *B. cumingi* fed on both green algae and diatoms to the same degree but *B. nigrofasciatus* fed on green algae in preference to diatoms. Blue-green algae were not ingested by both species in the stream as well as in aquaria. In aquaria, both species fed on a formulated dry feed in preference to feeding on the aufwuchs layer.

The relative gut length (RGL) of *B. cumingi* varied from 0.96 to 2.64 while that of *B. nigrofasciatus* varied from 0.89 to 2.54. These ranges agree well with the observed RGL ranges of other omnivorous cyprinids. The RGL increases with increase in body size in both species.

Both species breed throughout the year but enhanced breeding was observed during less rainy months. *B. nigrofasciatus* spawned predominantly among the submerged aquatic macrophytes whereas *B. cumingi* spawned at the edge of the stream in more-or-less open very shallow areas. When suitable macrophytes were not available, *B. nigrofasciatus*

spawned in habitats similar to those used by *B. cumingi*. *B. cumingi* showed territorial behaviour but *B. nigrofasciatus* formed loose aggregations for breeding. Males of both species were aggressive towards potential rivals. Spawning of both species occurred in well-lit areas usually between 0900 and 1600 hrs.

Sex ratio of *B. cumingi* was 0.78 favouring females whereas that of *B. nigrofasciatus* was 0.67. Sex ratios did not fluctuate significantly over the months. A higher proportion of females occurred in higher size classes of *B. cumingi* and lower size classes of *B. nigrofasciatus*. The mean size at maturity was 33.0 mm (54% of maximum size) in *B. cumingi* and 31.5 mm (60% of maximum size) in *B. nigrofasciatus*. Both species showed multiple peaks in the size-frequency distribution of ovarian eggs suggesting multiple spawning. Although fecundity was positively and significantly correlated to both body size and body weight, the high scatter of the fecundity-length diagram indicated that both species may be serial spawners as well.