Aspects of the length, mass, fecundity, feeding habits and some parasites of the shortfin minnow, *Barbus brevipinnis* (Cyprinidae) from the Marite River, Mpumalanga Province, South Africa

GWC Schulz* and HJ Schoonbee
Department of Zoology, Rand Afrikaans University, PO Box 524, Auckland Park 2006, South Africa

Abstract

The ecology of the shortfin minnow *Barbus brevipinnis* from the Marite River, Incomati River system, Mpumalanga, was investigated. Aspects considered include length, mass, feeding biology, fecundity and the occurrence of ecto- and endoparasites. Factors which may affect the incidence and eventual survival of the shortfin minnow in the Incomati River system are briefly discussed.

Introduction

There are a number of factors which seriously affect the ecology of streams and lakes in South Africa. Pollution from mines and industries has already caused major, sometimes irreversible changes and deterioration in the water quality and biology of such waters (Förstner and Prosi, 1979; Van der Merwe et al., 1990; De Wet et al., 1994; Van Eeden and Schoonbee, 1996). Habitat destruction due to the erection of weirs and the afforestation of otherwise clean and unpolluted headwaters of streams may further threaten the survival of ecologically sensitive fish species due to the obstruction and siltation of their breeding and feeding grounds (Crass, 1969; Chutter, 1969; Gaigher et al., 1980; Allanson and Rabie, 1983; Cambray, 1985). The medium- to long-term effects of afforestation, particularly in headstreams of rivers, are also reflected in the reduction of streamflow and the resultant stagnation of streams. This may in turn directly threaten the very existence of particular fish species with confined natural distribution and occurrence in such areas. Such is the shortfin minnow, *Barbus brevipinnis* (Jubb, 1966), which has its natural distribution in the headwaters of the Sabie, Incomati and Steelpoort Limpopo River systems (Skelton, 1993).

Barbus brevipinnis was first described in 1966 by Jubb from a locality in the Marite River, in the catchment of the Sabie and Sand River tributaries of the Incomati River system where it occurs along the escarpment of the Mpumalanga Province (Fig. 1). It was also recorded from the Mogol, Lephalala (Kleynhans, 1983), Marico, Matlabas, Mogalakwena and Levuvhu Rivers (Kleynhans, 1992). Recent protein starch-gel electrophoretic studies by Engelbrecht and Van der Bank (1994) suggest that the shortfin minnow may be confined to the Sabie-Sand River tributaries (Fig. 1) as well as the Manzaan River of the Pongolo River system (Engelbrecht and Van der Bank, 1996). The fish species which was provisionally identified as *Barbus brevipinnis* in the Levuvhu River has, however, not been confirmed electrophoretically. Until such time, the actual distribution of *B. brevipinnis* in the Levuvhu River must therefore be considered as tentative.

In addition to the large-scale afforestation and construction of dams in the catchment areas of rivers where *B. brevipinnis* naturally occurs, the introduction of the rainbow trout *Oncorhynchus mykiss* (Walbaum, 1792), may further endanger the survival of this barb in the affected waters. Largely due to its clearly restricted recorded distribution, its ecology was investigated, looking at aspects such as length and mass relationship, fecundity, food habits and ecto- and endoparasites, where it occurs in the Incomati River system. This investigation stretched over a period of four successive seasons between April 1990 and January 1991.

Materials and methods

Limited physical and chemical analyses were made according to standard international procedures (*Standard Methods*, 1989) on water samples collected at the various sites during the different seasons of the investigation.

Fish were caught seasonally at randomly selected sampling sites during autumn (March to May), winter (June to August), spring (September to November) and summer (December to February) using a modified Moore-type electric fish shocking apparatus (Moore, 1968) as well as scoop nets. Associated fish species were also collected at the same time. All fish captured were immediately preserved in labelled bottles containing 10% formalin for later analysis. At the laboratory each specimen was surface-dried with filter paper. The total (TL), standard (SL), and fork length (FL) as well as the mass of each fish were accurately determined to the nearest mm and nearest mg, respectively. The gonads were carefully removed, surface-dried and weighed to the nearest mg. Subsamples of the gonads were taken and individually weighed. Eggs from each subsample were then sorted into different size classes and counted, using a dissection microscope with a calibrated eye piece. The number of eggs for each ovary in the different size classes were calculated. This procedure was followed for all females collected during each season. In the case of mature females collected during the various seasons, the mean

* To whom all correspondence should be addressed.
☎ (013) 235-23395; fax (013) 235-1674; e-mail gschulz@intekom.co.za
Present address: Mpumalanga Parks Board, Private Bag X1088, Lydenburg 1120, South Africa.
Received 20 May 1998; accepted in revised form 1 October 1998.