Notes and records

The African clawless otter *Aonyx capensis* (Schinz, 1821) and its diet as an indicator of crayfish invasion dynamics in aquatic systems

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Introduction

The overall health of aquatic ecosystems is a major concern to conservationists in Africa, but the study of this subject has been overshadowed by overemphasis on the availability and quality of water. This has led to studies concentrating on chemical pollution and extraction of water. This is partly because of the expense of studying biological invasions and their impacts on ecosystems. For effective monitoring of ecosystems, methods need to be sustainable in the long term. Present methods for assessment of aquatic communities, e.g. electrofishing, are not easily applicable to Africa for reasons of expense, time and dangers of this activity in the presence of animals like hippos and crocodiles, which may be antagonized by electricity.

There is an urgent need for methods that are environmentally friendly. Kruuk & Goudswaard (1990) successfully used the sizes of fish eye lenses to assess prey size selection by both otters in Lake Victoria. Further improvement of these methods for various species will result in monitoring techniques that can be applied to larger aquatic ecosystems over longer time frames.

Materials and methods

Study area

This study was carried out in the Ewaso Ng'iro river and two of its tributaries, the Burguret river and the Ewaso Narok river in central Kenya, East Africa. The Ewaso Ng'iro river flows from the Aberdares and Mt Kenya through Laikipia and Samburu Districts of central Kenya, ending in the Lorian swamp. The Ewaso Ng'iro river is an important component of the Laikipia and Samburu ecosystems because these are semi-arid areas receiving an average of 600 mm of rainfall per annum (Paton & Ogada, 2001). It is the only permanent water source for livestock as well as the large wildlife population in the area.

Collection and analysis of scats

Otter scats were collected from all of the sampling sites weekly and were distinguished from those of marsh mongoose (*Atilax paludinosus*) by the shape, aggregation and smell. The scats were then taken to the laboratory and dried to constant weight, which was then recorded. A total of 1086 scats were collected during the study.

Scat analysis was performed under a dissecting microscope and the various components were separated using forceps and weighed. The percentage of each component in every faecal pellet was then calculated and recorded. Intact crayfish appendages were retrieved, measured and their dimensions recorded.

Trap sampling of aquatic fauna

This was performed using funnel-mouthed wire mesh traps. These are made using 1.875-cm-size wire mesh reinforced with binding wire. These are weighted with stones, placed on the bottom of the river, baited with meat and secured to the river bank using nylon string. Traps were checked, emptied and re-baited every 24 h. Sites were located every 1 km within the Ewaso Ng'iro, Ewaso Narok and Burguret river study areas. Crayfish caught in the funnel-mouthed traps were weighed and the dimensions of various appendages measured.

Results

Significant mathematical relationships were found between the dimensions of the various appendages and live weights of the crayfish:

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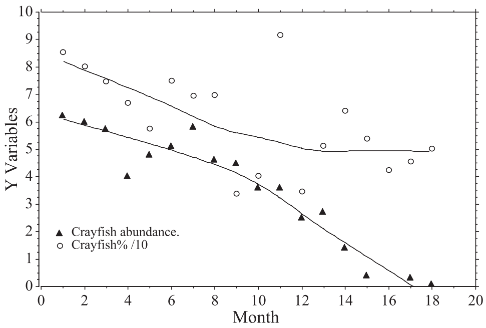

Fig 1 Trends in crayfish abundance and content in otter faecal pellets

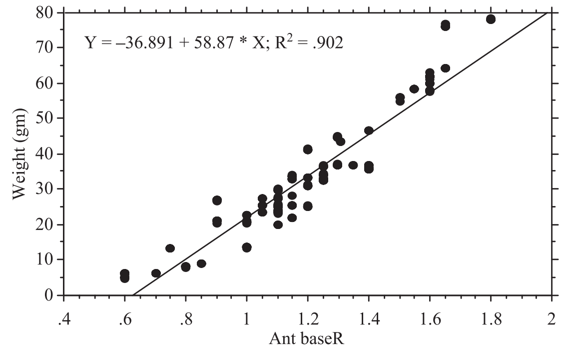

Fig 2 Regression plot of right antennule base width against live crayfish weights

(a) Exopodite: $Y = 9.541 + 0.067X$; $W'2 = 0.486$
(b) Claw: $Y = 17.102 + 0.82X$; $W\backslash 2 = 0.786$
(c) Endopodite: $Y = 9.541 + .067X$; $R!\backslash 2 = 0.486$
(d) Antennule base: $Y = -36.891 + 58.87X$; $R!\backslash 2 = 0.902$

Antennule bases were found to have the best statistical fit to the live weight of the crayfish (Fig. 2). There was a significant (corr = 0.573, $z = 2.524$, $P < 0.05$, n = 18) correlation between the trap sampling yield and the mean monthly percentage of crayfish in otter scats (Fig. 1).

Discussion

This technique is potentially useful for tracking trends in individual species, particularly those that are endangered or invasive. It is important to identify parts that are persistent in faeces, paired and rarely discarded. In this case, the antennule bases satisfied all these criteria. For assessment of fish intake by otters, Kruuk & Goudswaard (1990) used fish eye lenses, so the principle is also adaptable to other taxa. It is also important to choose the smaller dimension of the particular appendage to minimize the possibility of fractions on account of damage by mastication. The Louisiana crayfish is a widespread invasive species in Kenyan aquatic ecosystems and this is a promising technique for long-term monitoring of its population dynamics. The discrepancy between trends in the trap sampling yield and the percentage of crayfish in otter faeces from the 13th month illustrates the difference in efficacy of the two methods. Faecal content of an active predator is more accurate than the yield from a passive trap when monitoring low or fluctuating abundances of aquatic fauna. This is underscored by the persistence of crayfish in otter faeces beyond the threshold at which the trap yield reached zero per trap/night.

Otter territories are marked using latrine sites (Kingdon, 1997) and these are ready sources of faecal samples. This diet assessment method, coupled with use of scats to map territories (Ogada, 2004), forms a cheap and effective study method for aquatic ecology.

References

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