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A FRESHWATER DIAPTOMID COPEPOD HARVESTED FOR HUMAN CONSUMPTION IN CENTRAL LAOS

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***ABSTRACT.* –** During fish surveys in Laos in 1997, a small fishery for an unnamed copepod of the genus *Allodiaptomus* (Calanoida: Diaptomidae: Diaptominae) was discovered along the Xe Lanong. The copepods are harvested in man-made triangular shelters built in the river, along the shores and stored salted in bamboo tubes . The resource is apparently not rare as it is reported to show up in the local markets. Apparently, this is the first record of humans harvesting freshwater copepods for food.

***KEY WORDS*. –** Laos, freshwater, copepod, *Allodiaptomus*, edible, food.

INTRODUCTION

Laos is a landlocked country whose biodiversity is still very poorly documented. Very little has been published during the colonial period, and since independence, war and politics have made biological exploration almost impossible. This is even more true for its aquatic biodiversity and for long the available data were limited to lists of fishes occurring in the Mekong where it forms the border between Laos and Thailand (Kottelat & Whitten, 1996). It is only recently that this situation has changed and some conservation and development agencies have started paying attention to the local aquatic biodiversity. I report here on an unnamed freshwater copepod of the genus *Allodiaptomus*, which is the basis of a small local fisheries and is a regular component of human alimentation.

OBSERVATIONS

The Xe Lanong is one of the main branches of the Xe Banghiang, itself entering the Mekong downriver of Savannakhet. In the village of Muang Nong (16°21'57"N 106°29'51"E), although already in a hilly area, the Xe Lanong is still a large river, about 30–50 m wide. About 7 km downstream of Muang Nong, rocky outcrops (apparently basalt) cross the river, creating rapids in the dry season. At these outcrops, the river is relatively shallow (less than one metre deep) and a ford can be crossed by trucks. During the dry season, these outcrops form a kind of natural dam across the river and, as a result, for about 10 km immediately upstream, the river appears like a narrow, long lake, with no apparent current. The shores are steep and depth is reported to be about 10 m in Muang Nong. In the rainy season, the water level increases by several meters and the rocky outcrops most likely no longer function as a dam.

Along the steep shores, villagers at Muang Nong construct a series of triangular shelters (Fig. 1a) in which an unnamed calanoid (*Allodiaptomus* sp.) is harvested. The apex of the shelters is pointed upstream and the two sides that face upstream reach the surface, forming a chevron-shaped structure. The arms of the chevron are about three metres long; the arm towards the shore is commonly shorter than the other. These structures are made of bamboo and branches. The copepods proliferate in these sheltered waters and they are harvested by filtering the water with a piece of cloth, about triangular shaped, carried by a lace around the neck (Fig. 1b). The harvest is regularly washed to a pocket on the side of the 'net' (Fig. 1c). At the time of my visit (27 Apr.1997) the season was said to be finishing and the shelters were said to be no longer very productive. I do not have information on the total harvested biomass and total duration of the harvest period, but judging from the construction it must be restricted to the low water season (about January–May). A single woman was observed collecting about 0.2–0.3 l of compacted copepods in about 30 minutes (Fig. 1b, c). The collected sample contains a single diaptomid species.

The compacted copepods are salted and preserved in bamboo tubes and are part of the diet of the villagers and is seen on markets in Savannakhet province; they are called "pa kh-gnong" (Baird, 1998); 'pa' means fish in the Lao language. Baird also records that this fisheries is known in villages along the Xe Lanong and its tributary the Xe Samouan in Muang Nong district, and possibly in an uninvestigated river in the

nearby Xe Pon district. This is apparently the first report of a freshwater copepod used directly as human food.

DISCUSSION

The interest in the freshwater biodiversity of Laos has long focused mainly on charismatic animals (e.g. river dolphins; Baird & Mounsouphon, 1994) and fishes. For example, the number of fish species known from the country increased from about 210 recorded in 1995 to more than 480 in 1999 (Kottelat, 1998, 2000, 2001). I have been involved in various fish surveys in Laos. As a "by-product", other aquatic organisms were occasionally observed, and this is how a copepod fisheries was discovered in 1997 in a branch of the Xe Banghiang. This is apparently the first record of a calanoid copepod used directly as human food. The copepod is an unnamed diaptomid calanoid species of the genus *Allodiaptomus* (Fiers et al., 2003). For reasons beyond my control, the formal description and naming of this species unfortunately has been delayed for many years and I am unable to predict when it might appear. The species and the fact that it is harvested has been mentioned in some international meetings (e.g. Fiers et al., 2003) and in grey literature (Baird, 1998) but no real information on the fisheries has been published yet. Having waited 10 years for the description of the species, it seems reasonable that proper information be made available now without further procrastination. There are numerous development projects in Laos, involving (and impacting) most river drainages and it is necessary to call attention to the existence of such aspects of the aquatic biology and fishery of the country, and to give no excuse to developers and environment consulting firms for overlooking it.

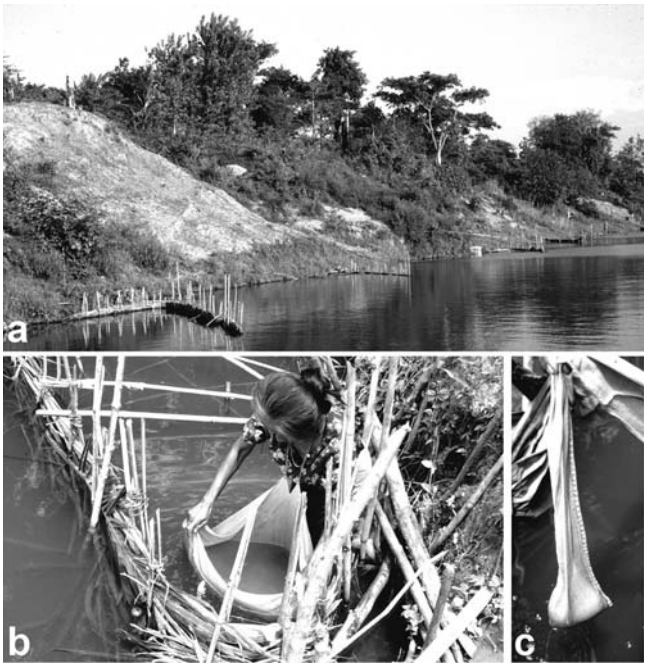

Fig. 1. Calanoid fisheries in Xe Lamong at Muang Nong, Laos. a, habitat, showing four bamboo shelters; b, villager harvesting the calanoid in a bamboo shelter; c, pocket on side of 'net', filled with the calanoid.

In the context of management of freshwater biodiversity resources, much emphasis has been given to fisheries and its economic value. The valuation of freshwater biodiversity only from the fisheries point of view is of course very biased as it ignores that 'fish' (and fisheries products) are not the only freshwater resources and that aquatic biodiversity also has other uses than food (fertilizer, medicine, pet trade) and offers other 'services' as an integral part of dynamic food chain and other biological processes. Even within a strictly fisheries management context, Kottelat & Whitten (1996: 7) stressed that fisheries statistics have several very serious shortcomings, the most salient one being that they represent only catches sold in markets and completely overlook subsistence fisheries, which represent a much larger biomass. Subsistence fisheries is a crucial resource for the majority of the population along rivers; large fish are brought to the market or sold to middlemen (and sometimes enter statistics), while small-sized catches (small fishes, frogs, tadpoles, snails, mussels, beetles, bugs, etc.) are eaten locally and are probably the main source of animal protein for many of the poorest populations but never enter statistics.

The unnamed calanoid is another example of inconspicuous animals used as human food and easily overlooked when managing natural resources. It is also a source of food which is probably highly dependent on habitat quality. Although the habitat is subject to important yearly, cyclical changes, it seems likely that even slight alterations of the dry season conditions (especially flow and turbidity, thus light penetration and primary production) would negatively impact these fisheries and possibly lead to its collapse.

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