Indian Journal of Fisheries 38 (1) : 9-12, March 1991

Spawning and growth of three species of threadfin breams off Madras

E VIVEKANANDAN[1]

Veraval Research Centre, Central Marine Fisheries Research Institute, Veraval, Gujarat 362 265

Received: 15 September 1990

ABSTRACT

Threadfin breams *Nemipterus mesoprion, N. tolu* and *N. delagoae* matured at 115, 130 and 125 mm total length respectively. The intense spawning activity of the 3 species was during February and March. The K values of von Bertalanffy growth equation were 1.080, 0.828 and 0.761 for *N. mesoprion, N. tolu* and *N. delagoae*, respectively; the corresponding L_{∞} values were 207, 282 and 271 mm.

Considering the importance of threadfin breams, Vivekanandan and James (1986) studied the spawning, growth and population dynamics of *Nemipterus japonicus* in the trawling grounds off Madras. As a continuation of this study, the spawning and growth of 3 other species of threadfin breams, viz. *N. mesoprion* (Bleeker), *N. tolu* (Valenciennes) and *N. delagoae* Smith, were studied. The results obtained during the study are presented in this paper.

MATERIALS AND METHODS

Data on catch and effort as well as samples for length and other studies were collected twice a week from commercial trawl landings at Pudumanikuppam landing centre (Madras) and weighed for monthly values. Data on total length (from tip of snout to tip of lower caudal lobe), weight, sex and stage of maturation were obtained from fresh specimens. The parameters of growth were estimated using von Bertalanffy equation.

Present address: [1]Scientist Selection Grade.

RESULTS AND DISCUSSION

Maturation and spawing

For this study, only females of *N. mesoprion* (N, 1018; length range, 96–180 mm), *N. tolu* (N, 733; length range, 110–219 mm) and *N. delagoae* (N, 940; length range, 100 – 235 mm), collected during 1983, 1984 and 1985, were considered. Females in stage III and above stages of maturation were considered mature. In each 10 mm length group, the number of mature females was noted and scaled to percentage. In *N. mesoprion*, though mature ovary was observed in a few individuals above 100 mm length, but 50% of the individuals were mature at 115 mm, which was considered as the length at first maturity (l m) of this species. Similarly, the length at first maturity of *N. tolu* and *N. delagoae* were 130 and 125 mm respectively (Fig. 1).

For determining the spawing season, females above length at first maturity were considered. The number of mature females of each species in corresponding months of 1983, 1984 and 1985 were pooled and the monthly percentage frequency distribution was plotted

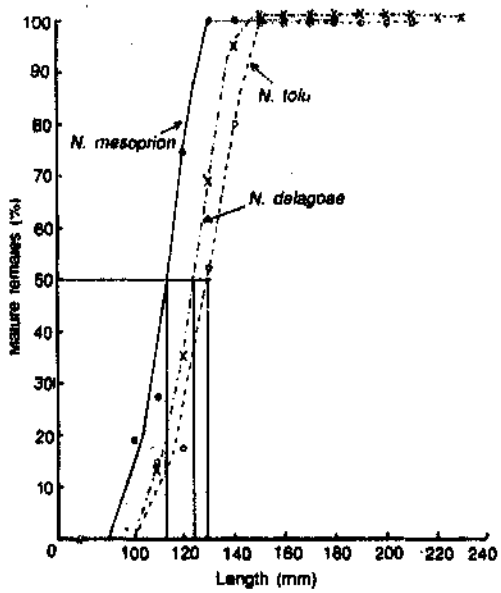

Fig. 1. Frequency of mature females (%) of *N. mesoprion*, *N. tolu* and *N. delagoae* in relation to total length.

(Fig. 2). All the 3 species exhibited 2 spawning seasons — intense spawning during February and March followed by another mild spawning during August – October. Dan (1980), Murty (1981, 1984) and Vivekanandan and James (1986) also observed almost the same period (January – April) as the main spawning season of the threadfin breams, *N. japonicus* and *N. mesoprion* along the east coast of India.

Growth

Total 2 650 specimens of *N. mesoprion* (length, 52–195 mm), 2 128 specimens of *N. tolu* (length, 49–265 mm) and 2 327 specimens of *N. delagoae* (length, 48 – 259 mm) were measured during July 1981 – December 1985. The modes in the length frequency distribution of each month were plotted (Figs 3–5) and by connecting maximum number of modes, growth curves for the 3 species were obtained. The lengths attained at quarterly intervals, read from each curve (starting from the minimum modal length), were used to estimate the von Bertalanffy parameters of growth. The values of K, L_∞, t_0 and lengths at different ages thus estimated are presented in Table 1. *N. mesoprion* had the highest K (1.080) and the lowest L_∞ (207 mm) values.

Earlier studies showed that the growth studies were restricted to the 2 major species, viz. *N. japonicus* and *N. mesoprion*, and that there was almost no information on the von Bertalanffy parameters of growth of threadfin breams of the west coast. There was wide difference among the available growth values. For instance, the K value of *N. japonicus* ranged from 0.294 (Krishnamoorthi 1973) to 1.004 (Vivekanandan and James 1986) and the length at the completion of I year from 123 (Rao and Rao 1986) to 165 mm (Vivekanandan and James 1986). It was not clear whether the wide range of values was in response to biological or spatial or environmental differences or due to differences in the methodology followed by the authors in estimating the growth parameters.

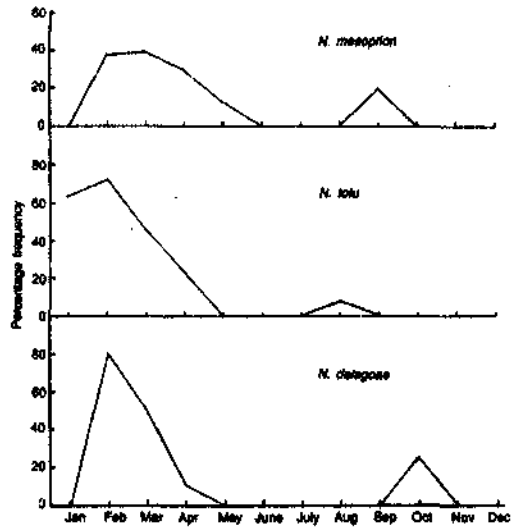

Fig. 2. Monthly frequency of mature (stages V and VI) females (%) of *N. mesoprion*, *N. tolu* and *N delagoae*.

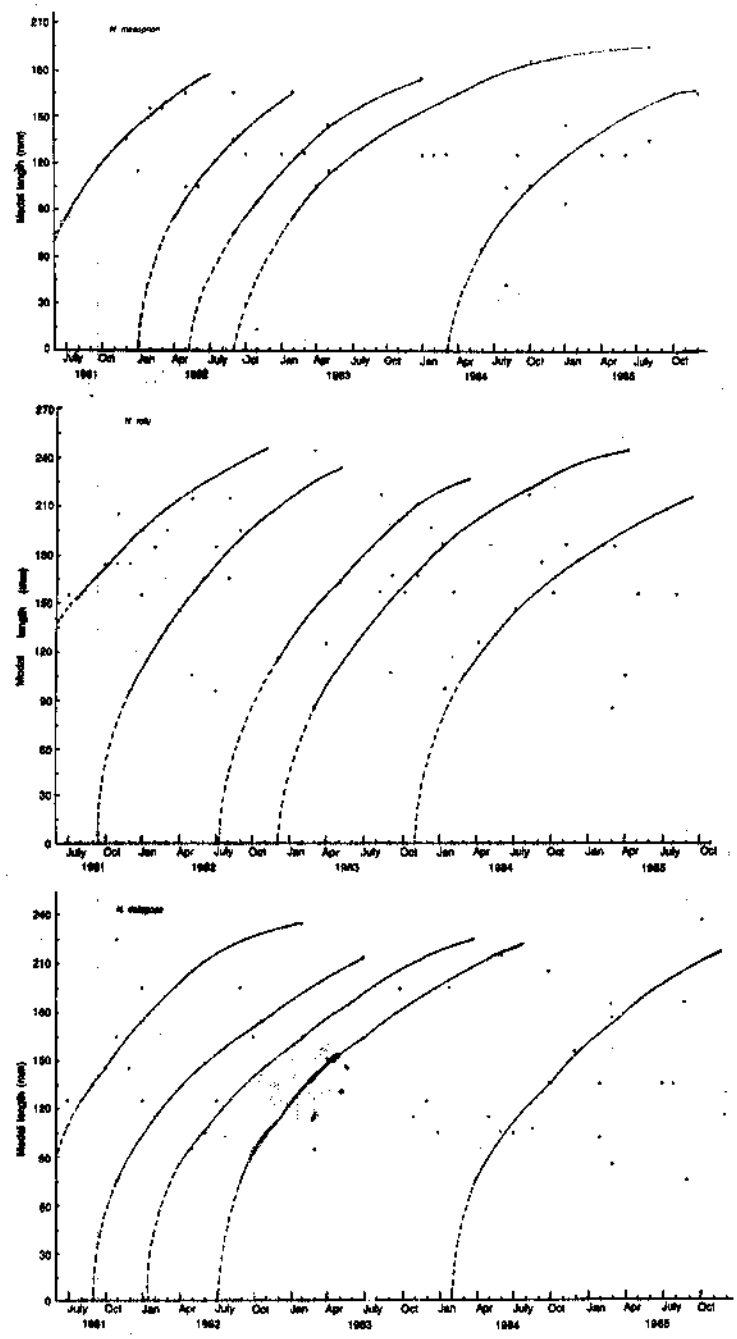

Fig. 3–5. Growth in length of (3) *N. mesoprion*, (4) *N. tolu* and (5) *N. delagoae* on the basis of modal progression; dotted lines are extrapolated portion below the observed minimum length.

Table 1. Von Bertalanffy growth parameters for 3 species of threadfin breams

Species	K (annual)	L_∞ (mm)	t_0	Length (mm) at 1 year	2 year	3 year	4 year
N. mesoprion	1.080	207	–0.1927	150	188	200	205
N. tolu	0.828	282	–0.2791	184	239	263	274
N. delagoae	0.761	271	–0.1616	159	219	247	260

On the basis of present and earlier studies, the length at first maturity of the threadfin breams could be correlated to the respective L_∞ values. The lm/L_∞ ratio for *N. japonicus* (Vivekanandan and James 1986), *N. tolu* and *N. delagoae* (present study) off Madras was about 0.46 (for *N. mesoprion*, the ratio is 0.55); for *N. japonicus* and *N. mesoprion* off Kakinada (Murty 1981, 1984), the ratio was 0.40 and 0.46 respectively. The proximity of most of these values to centre around 0.46 suggested that a detailed investigation on the lm/L_∞ ratio in different regions of the Indian coast may provide a possible index for estimating L_∞ of different species of threadfin breams directly from lm or vice versa. More information on growth of the threadfin breams is wanted to properly understand the biological characteristics of this important demersal resource.

REFERENCES

Dan S S. 1980. Intra-ovarian studies and fecundity in *Nemipterus japonicus* (Bloch). *Indian Journal of Fisheries* 24: 48-55.

Krishnamoorthi B. 1973. Biology of threadfin bream, *Nemipterus japonicus* (Bloch). *Indian Journal of Fisheries* 18: 1-21.

Murty V S. 1981. Observations on some aspects of biology of threadfin bream, *Nemipterus mesoprion* (Bleeker) from Kakinada. *Indian Journal of Fisheries* 28: 199-207.

Murty V S. 1984. Observations on the fisheries of threadfin breams (Nemipteridae) and on the biology of *Nemipterus japonicus* (Bloch) from Kakinada. *Indian Journal of Fisheries* 31: 1-18.

Rao D M. and Rao K S. 1986. Studies on the age determination and growth of *Nemipterus japonicus* (Bloch) off Visakhapatnam. *Indian Journal of Fisheries* 33: 426-39.

Vivekanandan E and James D B. 1986. Population dynamics of *Nemipterus japonicus* (Bloch) in the trawling grounds off Madras. *Indian Journal of Fisheries* 33: 145-54.