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Poor Feed Conversion of Tawes (*Puntius gonionotus*) when Fed High Protein Pellets in Hapa Culture in Northeast Thailand

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Abstract - Tawes grew reasonably well but showed unfavorable feed conversion when reared in hapas on catfish pellets with a 35% protein content. Inefficient dietary protein digestion (fishmeal) in view of its herbivorous preference was suggested.

In Thailand, tawes (*Puntius gonionotus*, syn. *P. javanicus*), has traditional consumer acceptance and its farming has long been promoted by the Department of Fisheries (Fedoruk 1983). Large tawes (> 100 g) accept soft weeds, although they could not survive on weeds alone in aquaria (Middendorp, unpubl. data). Tawes accept pellets readily.

Tawes was also the first fish bred in Thailand on a large scale by the hypophysiation technique. Tawes accounted for half of the total fry production in private hatcheries in Thailand (Little et al. 1987) but accounted only for about 10% of total freshwater produc-tion (Sipitakkiat and Leenannond 1984). Also fisheries development workers often reported disappointing yields of tawes, leading to such rules-of-thumb as: "Never more than 1/3 tawes in polyculture; and in monoculture, not more than one tawes per square meter." With-out additional feeding in the often troubled pond water of pH=6-6.5 generally encountered in Northeast Thailand, tawes need two years to reach a "consumable" size of 100 g or more (Middendorp, unpubl. data). It was hoped that better growth could be realized in hapa culture.

In this study, the results of rearing trials with tawes in hapas fed with catfish pellets, are presented. These trials were carried out

simultaneously with trials on tilapia reported earlier by Middendorp and Verreth (1992).

Tawes fingerlings of 15-g mean weight were reared in hapas by a farmer in Ponebeng, by another farmer in Ponemueang village, and by students at Srisaket Agricultural College. The hapas had a water volume of 8 m^3 (Middendorp and Verreth 1991). Fish were stocked in January 1987, at a density of 16 fish/m^3. Water temperature varied from 25 to 28°C in the afternoon. A commercial floating pellet (Charoen Phokpand brand) for catfish fingerlings (35% protein content, diameter est. 3 mm) was fed three times daily to satiation.

Both at the College and in Ponemueang, a pair of hapas was used, pooling the fish at harvest. Specific growth rate (SGR), feed conversion rate (FCR) and mean feeding rate were computed according to procedures described by Middendorp and Verreth (1991).

Results are presented in Table 1. Mean SGR was 1.50% BW/day (CV=17.7%), and mean FCR was 3.83 (CV=2.2%). Overall survival was 78% (CV=35.7%).

The SGR obtained for tawes were acceptable and comparable to those obtained for tilapia in the parallel experiment (tilapia mean SGR=1.46% in Middendorp and Verreth 1992). However, FCR were

Table 1. Grow-out of tawes in hapas on floating pellets for catfish. Mean stocking weight: 15 g. Final weight per farmer (W_t), total fish per farmer at harvest (N), rearing time (t), specific growth rate (SGR), feed conversion ratio (FCR) and calculated daily feeding ratio (R).

	W_t	N	SV	t	SGR	FCR	R
Ponebeng*	69	131	97	86	1.77	3.77	6.7
Ponemueang	76	250	46	109	1.49	-	-
College*	34	272	91	67	1.24	3.89	4.8

*Fish equally divided over two hapas and pooled at harvest

rather high; feed costs per kg fish being twice the market price. High FCR and good SGR result in high mean daily feeding rates (R), suggesting feed wastage. (But the fish fed voraciously, and floating pellets that might have been spat out afterwards, should have been noticed.)

Unfavorable FCR in tawes, were also reported by other authors in Thailand. Duangsawasdi et al. (1986) found an FCR of 4.46 (SGR=1.88% BW/day, R=8.8%) at a density of 35 tawes per m^3 and

168 rearing days. Wee and Ngamsnae (1987) found for tawes fingerlings in tanks, at a protein content of 35%, an FCR of 2.56 (SGR=1.85% BW/day, R=4.7%); while higher dietary protein gave similar results.

Wee and Ngamsnae (1987), with their diets based on fishmeal, further reported for tawes an apparent protein digestibilty of only 63.3%, compared to 90% for Mozambique tilapia and 75-94% for the carnivorous snakehead (*Channa striata*) (Jauncey 1982; Wee 1983). It is suggested that fishmeal as the main dietary protein component in catfish pellets may not be appropriate to tawes, which is herbivorous.

Wee and Ngamsnae (1987) finally hypothesized that better FCRs might be obtained in cage culture with organic particles and algae available to the fish. However, tawes are not microphagous like Nile tilapia, and a "green water" effect from natural feed for tawes should likewise result in high, unfavorable FCRs, as found in the present study and by Duangsawasdi et al. (1986).

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