

アメリカミズアブ幼虫はキノポリウオの飼料タンパク質源として有効である

Efficacy of the black soldier fly larvae as a protein source in aquaculture feed for the climbing perch

ラオスでは、近年の人口増加に伴い食用魚需要が急速に高まっており、養殖振興のニーズが高いが、輸入に依存している高い飼料コストが養殖の普及を阻害する要因の一つとなっている。そこで、ラオス国内に分布するアメリカミズアブ (*Hermetia illucens*) を人為的に飼育し、得られる幼虫を肉食性のキノポリウオ (*Anabas testudineus*) の養魚飼料のタンパク質源として用い、成長および飼料中のタンパク質の同化性を比較した。その結果、通常の魚粉飼料を与えたものと同程度の成長を示すとともに、ミズアブ幼虫を用いた方がタンパク質同化性に優れる現象が見られ、ミズアブ幼虫を用いることで飼料中のタンパク質水準の軽減が可能となり、ひいては餌コストの軽減も可能と考えられた。

In Laos, aquaculture promotion is required to increase protein supply to the public. However, the high cost of imported aquaculture feeds hinders promotion on a broader scale. Therefore, we incorporated the black soldier fly (BSF) larvae in feed with/without fishmeal (FM) for the climbing perch, and evaluated fish growth and protein assimilation. Results showed that fish growth of those given BSF feed was similar to those given FM feed, and that protein assimilation was better in fish given BSF feed than in fish given FM feed. These observations indicate that BSF larvae can be a practical substitute for FM, and that feed costs can be reduced by BSF incorporation.



図1 アメリカミズアブ幼虫(a)とキノポリウオ(b)
Fig. 1. Black soldier fly larvae (a) and the climbing perch (b)

表2 試験飼料T1、T2、T3によるキノポリウオの成長
Table 2. Growth performance of the climbing perch given the experimental feeds T1, T2 and T3

Growth index	T1	T2	T3
Total length at stocking (mm)*	46.3 ± 7.4	46.3 ± 7.4	46.3 ± 7.4
Total length at harvest (mm)**	159.9 ± 13.6	164.1 ± 11.7	160.9 ± 12.8
Body weight at stocking (g)*	2.2 ± 1.2	2.2 ± 1.2	2.2 ± 1.2
Body weight at harvest (g)**	85.1 ± 25.5	92.0 ± 22.3	83.5 ± 22.2
Survival rate (%)***	82.2 ± 2.0	81.7 ± 9.1	81.7 ± 2.9
Feed Conversion Ratio***	3.4 ± 0.2	3.2 ± 0.4	3.2 ± 0.1

*Values are the mean ± standard deviation, *n = 180, **n = 60, ***n = 3.

表1 試験飼料T1、T2、T3の一般栄養成分(%乾重量)
Table 1. Proximate contents of the experimental feeds T1-T3 (% dry matter)

Feed	T1	T2	T3
Crude protein	32.5	30	25
Crude fat	6.7	7.6	8.9
Crude ash	11.1	9.5	7.3
Crude starch	22.8	28	27.7

表3 試験開始時及びT1、T2、T3飼料で飼育された魚体の収穫時の体成分(水分、粗タンパク、粗脂肪、粗灰分)(% 乾重量)およびタンパク質効率と蓄積率
Table 3. Proximate contents of fish body reared by the feeds T1, T2 and T3, and indices of protein efficiency ratio and protein retention

Contents	At stocking	At harvest		
		T1	T2	T3
Moisture	77.6 ± 0.2 (6)	63.4 ± 1.5 (18)	62.8 ± 1.0 (18)	63.1 ± 0.8 (18)
Crude protein	14.9 ± 0.3 (6)	18.1 ± 0.3 (6)	17.8 ± 0.8 (6)	17.2 ± 0.6 (6)
Crude fat	2.8 ± 0.1 (6)	12.0 ± 0.9 ^a (12)	12.3 ± 1.7 ^a (12)	14.4 ± 2.2 ^b (12)
Crude ash	3.8 ± 0.6 (6)	5.4 ± 1.0 ^a (18)	5.7 ± 0.7 ^a (18)	4.1 ± 0.8 ^b (18)
Protein assimilation indices		T1	T2	T3
Protein efficiency ratio		0.9 ± 0.1^a (3)	1.1 ± 0.1^a (3)	1.3 ± 0.1^b (3)
Protein retention		16.4 ± 0.7^a (3)	18.8 ± 2.3^{ab} (3)	21.9 ± 0.8^b (3)

*Values are the mean ± standard deviation, *numbers in parentheses are the number of samples. ** Different capital letters indicate significant difference (Tukey's HSD test, p < 0.05).