



HAL
open science

Ecological intensification of giant gourami ponds in indonesia: biological effects of *Azolla filiculoides* in total or partial replacement of commercial feed on juveniles of giant gourami *Osphronemus goramy*

Domenico Caruso, Reza Samsudin, Angela Lusiastuti, Desy Sugiani, Simon Pouil, Jacques Slembrouck

► To cite this version:

Domenico Caruso, Reza Samsudin, Angela Lusiastuti, Desy Sugiani, Simon Pouil, et al.. Ecological intensification of giant gourami ponds in indonesia: biological effects of *Azolla filiculoides* in total or partial replacement of commercial feed on juveniles of giant gourami *Osphronemus goramy*. World Aquaculture Society: AQUA 2018, Aug 2018, Montpellier, France. hal-04198165

HAL Id: hal-04198165

<https://hal.science/hal-04198165v1>

Submitted on 6 Sep 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

ECOLOGICAL INTENSIFICATION OF GIANT GOURAMI PONDS IN INDONESIA: BIOLOGICAL EFFECTS OF *Azolla filiculoides* IN TOTAL OR PARTIAL REPLACEMENT OF COMMERCIAL FEED ON JUVENILES OF GIANT GOURAMI *Osphronemus goramy*

Domenico Caruso*, Reza Samsudin, Angela Lusiastuti, Desy Sugiani
Simon Pouil, Jacques Slembrouck

*IRD – ISEM UMR 226 Université de Montpellier, 34095 Montpellier cedex 05, France

The use of floating macrophytes such as *Azolla filiculoides* could represent an important alternative for partial replacement of commercial fish feed in small scale aquaculture; particularly for omnivorous/vegetarian fish as the giant gourami *Osphronemus goramy*. In order to evaluate biological impacts of macrophytes as feed on gourami, 480 juveniles (12.4±0.6 cm; 32.4±4.5 g) divided in four groups were placed in floating cages (three per group) and fed for six week using four levels of *A. filiculoides* in replacing commercial feed (A=100% B=56% C=29% and D=0%). Commercial feed were distributed at 5% of the biomass 3 times a day whilst *A. filiculoides* was distributed *ad libitum*. At the end of the experiment, zootechnical parameters, biochemical, somatic (HIS, SSI), and immunological indicators and histological modifications of gut have been quantified. In addition, effects of transportation stress and experimental infection with *Aeromonas hydrophila* have been evaluated.

Results shown that *A. filiculoides* depressed significantly the growth of gourami and that can be estimated through a polynomial regression ($R^2=0.99$). Compared to the control fish (100% commercial feed group D), the reduction of biomass gain in the others groups decreased of 18, 45 and 100% respectively according the level inclusion of *A. filiculoides* into the diet. Total protein, albumin and globulin in control fish were significantly lower compared to the others. Serum glutamic pyruvic transaminase was not modified by feeding regimes ($P=0.760$). Significant reduction of lymphocytes was observed in groups A and B ($P < 0.001$). In opposite, fish from these groups had significant higher level of monocytes ($P < 0.001$). Neutrophils were significantly increased only in group A ($P=0.012$). Plasmatic lysozyme, was significantly different ($P = < 0.001$) with an increase depending of the doses of *A. filiculoides* replacing commercial feed. Bactericidal activity of serum was also significantly increased according the level of *A. filiculoides* included into the feeding diet ($P < 0.001$, $n=15$ for each treatment).

Before stress, blood glycaemia was significantly lower in fish of group A fed with 100 % of *A. filiculoides* ($P < 0.001$); and after transport, the glycaemia increased significantly in all groups, excepted for group 100%. Fifteen days after transportation, the log rank survival analysis was different and mortality rate was significantly reduced in group A. One week after intramuscular injection of 0.1 ml 1×10^7 CFU/ml of *A. hydrophila*, the survival curves between groups were different ($P = < 0.001$) and survival times of groups A and B were significantly higher than the others two groups.

A. filiculoides showed positive effects on immunological indicators and resistance to stress and disease however, fish may require a longer time to obtain the commercial size. Under this point of view, further economic analysis should be undertaken; but results suggested that the replacement level of commercial fed by *A. filiculoides* shall probably not be over 30%.