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Effects of Fresh *Azolla microphylla* Supplementation on Pelleted Basal Diet to Local Muscovy Duck Breed Production Performances

Firmansyah Budi Pratama[1], Irfan H. Djunaidi[2], Eko Widodo[3]
[1]Postgraduate Student Program Faculty of Animal Science, Brawijaya University, Malang, Jawa Timur, 551661
[2,3]Lecture of Postgraduate Student Program Faculty of Animal Science, Brawijaya University, Malang, Jawa Timur, 551661

ABSTRACT: The study was aimed to evaluate the effect of feeding fresh *Azolla microphylla* on pelleted basal feed on the Local muscovy duck breed production performances. The research was done for 2 months August to September 2023, in the Muscovy duck farm, Paguyuban Petani Mandiri Kademangan, (PPMK), Blitar Regency, and feed analysis was done in the Nutrition and Animal Feed Laboratory, Faculty of Animal Science, Muhammadiyah Malang University. The research method used is experiment using a completely randomized design consisting of 3 treatments and 5 replications, each experimental unit used 4 ducks, reared and plotted randomly in the litter cage. The research variables observed were: day old duck weight, final weight, feed intake, FCR and performance index. The results of the study of the effect of supplementation 10% of fresh *Azolla microphylla* on the best performance index of Muscovy duck (*Cairina moschata*), can be apply for duck feed.

KEYWORDS: *Azolla microphylla*, Pellet.

INTRODUCTION

Muscovy duck (*Cairina moschata or* Entok in local named) is a domesticated waterfowl species originating from the Central American region but has now been widely adopted by traditional Indonesian farmers. Population of Muscovy duck in East Java from 2018 to 2022 increased from 1,522,663 to 1,540,704 (BPS, 2023), thant figured entok farm increasingly popular and widespread among smallholder farmers. The main product expected of entok are dual purposes : egg and meat production. For meat production, entok has a high body weight compared to chicken and duck (Lase and Lestari. 2020) so that the expected carcass produced is also quite large. This relevant to Mega *et al*. (2008) that the percentage of entog carcasses about 62.6%, while the carcass yield from ducks is only 53.41% (Dewanti *et al*., 2013).

Another advantage of Muscovy ducks is that they are known as forage-eating poultry and are able to consume high fiber and low protein feed such as grass and other forages. This is relevant to Sunday (2002) that ducks are still able to tolerate crude fiber, which is between 22% - 31%. Based on experiment result of Sutrisna (2011) the use of feed crude fiber in male ducks is only up to 20%, it can be seen that entok can digest crude fiber better than other poultry spesies. Entok also has advantages over other poultry including disease resistance, relatively easy maintenance, and high adaptability. In fact, the main obstacle in farming and increasing the productivity of entok is the traditional rearing management with improvised feed.

Azolla microphylla is a fern that floats on the surface of the water (Herlina and Novita. 2021). This plant is characterized by small, overlapping leaves, soft leaf surfaces, bright green color, and has a large number of spores. *Azolla microphylla* also has a high protein content and based on the results of chemical analysis of *Azolla microphylla* nutrient content, protein until 31.25%, fat 7.5%, soluble sugar 3.5% and crude fiber 6% (Herlina and Novita. 2021). The protein content of this plant is quite high with a good essential amino acid s composition as arginine, lysine, and methionine so that it has the potential to be used as poultry feed and also for ruminants (Thangadurai et al. 2020; Bhatt et al. 2020, Rahal, 2019). According to research by Raras *et al*. (2017), the addition of Azolla in feed can also reduce soybean meal by 4%. This is related to the amino acid content in it, namely lysine of 0.42%. Lysine is a precursor of carnitine biosynthesis, expected to increase carnitine biosynthesis in the body. The lysine content in azolla is also higher than corn which is only 0.20%. Another factor, Azolla also contains anti-nutritional substances, namely tannin. The anti-nutritional content of tannin in Azzolla ranges from about 1-3%.

Pellets are an application of advances in feed technology through the process of mixing various feed raw materials which are deliberately compressed then molded and exited from the machine through a mechanical process. The advantages of feed in the form of pellets include efficient feeding because it is not easily scattered or wasted, makes the feed more homogeneous, increases the

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density of feed and facilitates the process of transporting or moving through transportation equipment. The process of making pellets, especially in using forage additives, requires the right adhesive (binder) in its use (Herawati and Royani, 2020). Considering that ducks are livestock that can consume fiber from forage at a fairly high dose compared to other livestock. Research on feeding pellets to ducks is unique because ducks in the field are rarely given pelleted feed by farmers, so it requires its own adaptation. Based on the above background, this research was aimed to evaluate of the supplementation of *Azola microphylla* in fresh form to the basal feed in the form of pellets on ducks in terms of production performance.

MATERIAL AND METHOD

This research was conducted at the Entok Farm of Paguyuban Peternak Mandiri Kademangan, (PPMK) Blitar Regency and the Nutrition and Animal Food Laboratory of the Nutrition and Animal Food (NMT) section of the Faculty of Animal Husbandry, Muhammadiyah University of Malang. The research used a completely randomized design (CRD) consisting of 3 treatments and 5 replicates so that there were 15 experimental units. Each experimental unit used 4 entok whose placement in the cage was done randomly. The treatments given were:

P0: pelleted basal diet (without *Azolla microphyla*).
P1: pelleted basal diet + 5% fresh *Azolla microphyla*.
P2: pelleted basal diet + 10% fresh *Azolla microphyla*

Table 1. Nutrition content of basal feed

Nutrient(%)	P0 (%)
DM (Dry Matter Lab)	87,82
Ash	9,07
Protein	13,74
Crude Fat	7,39
Crude Fiber	2,59

Source: Sentar Laboratoirum, University of Muhammadiyah Malang (2023)

RESULT AND DISSCUSION

The result of supplementation effect of fresh Azolla to basal feed of Entok to the day old duck weight is presenting on table 2. Below.

Table 2. Effect of Fresh *Azolla microphylla* Addition on Early Weight of *Cairina moschata*

	UI	U2	U3	U4	U5	Total	Mean	SD
P0	160	351,75	497,75	447,5	430	1887	377,4	132,3684
P1	614,25	516,75	491,5	469,25	456	2547,75	509,55	62,9115
P2	747,25	703,25	816,75	506,5	641	3414,75	682,95	117,6259

Source: Primary Data (2023)

Previous research, Akbarillah, *et al* (2017) averaged entok body weight for early weight estimation ranging from 160 - 200 g/bird. Based on the results of this research that the value of the early body weight of each entok P0 (377,4 ± 132,36) P1 (509,55 ± 62,91) and P2 (682,95 ± 117,62) g/bird. The results of observations of giving pellets as basal feed with the addition of fresh *Azzolla mycrophylla* in ducks (*Cairina moschata*) had a very significant effect on the early body weight of ducks ($P<0.05$). The difference in the weight of the sample at the due to the different age of the dams, location factors, feeding treatments and farm management.

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Table 3. Effect of Fresh *Azolla microphylla* Addition on Final Weight of *Cairina moschata*

	UI	U2	U3	U4	U5	Total	Mean	SD
P0	375	765,25	1019,25	972,75	902	4034,25	806,85	259,76
P1	1380,75	1231,5	1060	969,25	1069,25	5710,75	1142,15	163,45
P2	1313	1315,25	1407,75	983,75	1172	6191,75	1238,35	165,38

Source: Primary Data (2023)

The result of supplementation effect of fresh Azolla to basal feed of Entok to the final body weight is presenting on table 3. above. Based on the results of research that has been done obtained the value of the final body weight of each cattle entok P0 (806, 85 ± 259,76), P1 (1142,15 ± 163,45), P2 (123,35 ± 165,38). This value shows has a significantly different effect (P<0.05) on the body weight of the entok. This is in line with the research of Basak, *et al* (2002) who used *Azolla microphylla* flour with various levels concluded that the use of *Azolla microphylla* flour in broiler chickens and Peking ducks produces optimal body weight and does not interfere with body metabolism. Reinforced by research from Meilita, *et al* (2018) the treatment of fermented *Azolla microphylla* flour in feed has a significant effect on the final body weight of crossbred chickens. This is thought to be due to the balance of essential amino acids in the feed that can support growth in crossbred chickens. Proven by research from Trisiwi *et al*. (2016) stated that crossbreed local chickens reared for 10-12 weeks can reach weights ranging from 900 - 1500 g.

According to Maryuni and Wibowo (2005), lysine is a critical essential amino acid for chickens to meet the growth needs of chickens so as to obtain fast and optimal growth. The balance of amino acids will support body weight gain in chickens so that they will achieve optimal body weight. Anggrodi (1995) found that that lysine is an amino acid that is antagonistic to arginine, an imbalance of amino acids requires relatively high energy, causing growth to not be optimal. Based on the results of the notation count, the best analysis results in the research that has been done can be concluded that treatment 2 is the best treatment in the provision of azzola pinata in terms of the final weight of entok. The result of supplementation effect of fresh Azolla to feed consumption of Entok to the day old duck weight is presenting on table 4. Below.

Table 4. Effect of Fresh *Azolla microphylla* Addition on Feed Consumption (g/bird) of *Cairina moschata*

	UI	**U2**	**U3**	**U4**	**U5**	**Total**	**Mean**	**SD**
P0	2221,9	3105,45	3398	3200,667	3394,75	15320,77	3064,153	487,4628
P1	3412,41	3550,16	3444,41	3469,91	3439,16	17316,05	3463,21	52,72019
P2	3264,45	3517,2	3493,2	3484,7	3490,2	17249,75	3449,95	104,4402

Based on the results of research that has been done, the value of feed consumption of entok livestock during the study was obtained respectively P0 (3064,15 ± 487,46) P1 (346,21 ± 52,72) and P2 (3449,95 ± 104,44). The observation of pellets as basal feed with the addition of fresh *Azolla mycrophylla* in entok (Cairina moschata) did not significantly affect the feed consumption of entok (P>0.05).

Based on the research of Hartati, et al (2023) in his research showed the addition of *Azolla microphylla* in the ration up to 20% did not affect ration consumption, daily body weight gain and feed conversion. The use of fresh *Azolla* in large quantities of 10% is predicted to be able to increase the palatability of entok because of the attractiveness of the color of Azolla which is quite striking compared to the color of pellet feed. Another advantage of Azolla is its soft texture and high nutritional value.

The result of supplementation effect of fresh Azolla to basal feed of Entok to the feed conversion ratio is presenting on table 5. Below.

Table 5. Effect of Addition of Fresh *Azolla microphylla* on FCR of *Cairina moschata*

	UI	**U2**	**U3**	**U4**	**U5**	**Total**	**Mean**	**SD**
P0	8,510311	5,267195	4,284318	4,357366	5,004853	27,42404	5,48	1,742389
P1	3,315701	3,890764	4,284536	4,592106	4,461613	20,54472	4,14	0,516113
P2	3,094022	3,399765	3,015604	4,589913	3,766403	17,86571	3,5	0,640632

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Based on the results of the research conducted, the FCR value of the entok livestock during the study was obtained, respectively P0 (5,4 ± 1,7) P1 (4,1 ± 0,51) and P2 (3,5 ± 0,6). The results of observations of giving pellets as basal feed with the addition of fresh Azolla to entok (*Cairina moschata*) had a significantly different effect on the FCR of entok (P<0.05). This is in line with the opinion of Akbarillah, *et al* (2017) in their research on the implementation of giving tofu pulp with different levels in basal feed also stated that the FCR level aged 3-10 weeks for Muscovy duck varies from 4 to 6.8. This is reinforced by research from Nana (2017) that the FCR level for Serati ducks whose type is classified as waterfowl ranges from 3,9 - 4,8 at the age of 12 weeks. Factors that influence the high and low feed conversion rates include temperature, the rate of feed passage and its composition and the physical form of feed, but for water-type birds, especially ducks, genetic factors are also very influential because there is lack of uniformity. The result of supplementation effect of fresh Azolla to basal feed of Entok to the body weight gain of is presenting on table 6. Below.

Table 6. Effect of Addition of Fresh *Azolla microphylla* on body weight gain (g/period) of *Cairina moschata*

	UI	U2	U3	U4	U5	Total	Mean	SD
P0	261,0833	589,5833	793,125	734,5417	678,2917	3056,625	611,32	209,6784
P1	1029,167	912,4583	803,9167	755,625	770,8333	4272	854,40	115,3286
P2	1055,083	1034,542	1158,375	759,2083	926,6667	4933,875	986,77	151,4875

Based on the results of the research that has been conducted, the PBB value of entok livestock during the study was obtained respectively P0 (611,35 ± 209,67) P1 (854,40 ± 115,32) and P2 (986,77 ± 151,48). The results of observations of giving pellets as basal feed with the addition of fresh Azolla to entok livestock (*Cairina moschata*) had a significantly different effect on the body weight gain of entok livestock (P>0.05). Based on the results of the notation analysis, treatment 2 with a dose of 10% fresh Azzolla is the best treatment with a notation value of 985,775 ± 151,48. This is in line with Dewanti's research (2007) which showed that the average body weight gain for P0, P1, P2, and P3 were 21.07; 22.86; 23.75; 23.21 g/head/day. The results of the analysis of variance showed that the mean body weight gain between treatments was significantly different. This shows that *Azolla* flour was affect to body weight gain. Azolla flour has a good content of both essential and non-essential amino acids.

CONCLUSION

Based on the conclusions of the study of the effect of the addition of fresh *Azolla mycrhophylla* on the performance index of the best Entok (*Cairina moschata*) livestock, is in treatment 2. So that a dose of 10% Azzolla as an additional basal feed for entok can still be recommended well for farmers.

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