Effectiveness duckweed (*Lemna minor*) as an alternative native chicken feed native chicken (*Gallus domesticus*)

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Abstract. This study aimed to know the effectiveness duckweed as feed as native chicken (*Gallus domesticus*) on growth period (weight gain, feed intake and feed conversion). This research was conducted in Desa Telaga Jernih Kabupaten Langkat. The study was conducted in February 2017 until May 2017. This study use completely randomized design (CRD) with 4 treatments and 5 Replication, where each treatment consisting of 5 Native chickens unsexing. The treatment was used P0 = control (feed manufacturing), P1 = ration conventional with 10% duckweed, P2 = ration conventional with 20% duckweed, P3 = ration conventional with 30% duckweed. The parameters observed were weight gain, feed consumption and feed conversion. The results showed not significantly effect in body weight gain, feed consumption and feed conversion. Where the average of best weight gain on treatment P0 (control), P2 (20% duckweed), P3 (30% duckweed) and P1 (10% duckweed), average of best feed consumption in P0 (control), P2 (20% duckweed) Of P1 (10% duckweed) and P3 (30% duckweed), P1 (10% duckweed) and P3 (30% duckweed), average of best feed conversion rate in P0 (control), P2 (20% duckweed) P1 (10% duckweed) and P3 (30% duckweed).

1. Introduction

In the need of protein needs, Indonesia's dependence on chicken meat is large, although, the need for chicken meat is dominated by chicken. While local chicken consumption is still low or only 6% of total national poultry production. Association of Local Poultry Farmers of Indonesia (Himpuli), said that the government still considers chicken as complementary to the poultry industry, not as a commodity considered strategic for food security. The government until now still positioning this local chicken is just a complement, just there. There is no policy direction to make local chicken as a strategic source of animal protein such as beef or chicken (broiler). Though this chicken is genetic source of indigenous Indonesia and chicken is a native Indonesian Germplasm that should be utilized for national poultry.

Other countries such as China and Thailand, precisely prioritize the existence of their local chicken as a source of animal protein strategic country. In fact, he explained, Indonesia has many strains (species species) compared to other countries. The common problem faced by the chicken breeders generally is the availability of limited source of feed ingredients, the pattern of traditional village chicken maintenance system to reduce production costs in terms of feed availability.

The needs of the farmers for the fulfillment of animal feeds make the government attempt to import food ingredients such as corn, soybeans, fish meal and so on the gradually the price is more expensive and the farmers can not cover the greater output to be issued. It is reflected in the event. The economic
The recession of 1997 in which the large number of farmers who could not continue their livestock business and was forced to cover up the business due to soaring import food prices.

We can solve the problem of feed from alternative feed, we are encouraged to think creatively and try to dig, and utilize all the potential that exists to solve the problem such as by utilizing the potential of local as animal feed, the local feed must of course meet the criteria both in terms of aspects Nutrition, economics, social culture, and the sustainability. so that it can become a source of feed ingredients that are available, cheap, easy to obtain, not polluting, and still in accordance with the culture of society, so that later easy to be accepted among the community. One way to find alternative high-quality feed is easy to cultivate and does not require extensive land. It is expected that this feed material can substitute some of the use of imported feed ingredients.

Local feed is the source of feed ingredients whose existence is located in Indonesia and is located around the farmers communities whose amount of feed resources can meet as a source of feed ingredients. One of them is the Lemma Minor Plant which its existence is often found in the community, especially found in rice field crops, this plant can be used as green manure, animal feed such as (Chicken, Duck, Rabbit, Horse, Goat, cow, Sheep, etc.), and can also be used as a fish feed (catfish, pomfret, etc.).

Lemma Minor is a species of water nail plant that floats mostly in stagnant waters, especially in paddy fields and in ponds, has a soft leaf surface easily develops and lives in symbiosis with Anabaena Lemma Minore that can fix Nitrogen (N2) from the air. Lemma Minor pinnata is a small plant that floats in water, looks triangular or rectangular. Lemma Minor measuring 2-4 cm x 1 cm, with branches, roots of rhizoma and floating leaves. The solitary root, suspended in water, hairy, 1-5 cm long, with a group forming 3-6 root hairs. The leaves are small, forming 2 rows, varying saturation, sitting attached, the lobe with the dorsal lobe holding on to the water surface and the ventral lobes float. In Indonesia Lemma Minor is known by the name of Mata catfish, while the local name Lemma Minor is “Mata Lele” (Java), “kakarewoan” (Sunda) its existence is Planteous, but not get good attention.

Lemma Minor plant has the characteristics of thick-green leafy green with a rather pale green edge, the growth of leaves overlap to form a cluster with a thickness of 1-3 cm, has a lot of spores. Lemma Minor is a type of water nail plant that floats mostly found in stagnant waters, especially in paddy fields and ponds, has a soft leaf surface easily.

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Lemma Minor is a nail-fern plant that floats on the water surface. Lemma Minor plant has a fairly high protein content of 28.12% dry weight [2], while [3] stated protein content in Lemma Minor sp for 23.42% dry weight with composition Complete essential amino acids. This plant can be used for livestock feed as well as ruminants because of its high protein content.

Several studies have found that the growth rate of Lemma Minor is 0.355 - 0.390 grams per day (in laboratory) and 0.144 - 0.860 grams per day (in the field). In general, maximum Lemma Minor biomass is achieved after 14 -28 days after inoculation.

From the various information it is increasingly clear that Lemma Minor has the potential to be utilized and developed in Indonesia as a source of feed ingredients when viewed from the nutrient content, the ability to breed and its usefulness as a feed ingredient can increase the rabbit cut weight, thus also needed further research on the utilization Lemma Minor as animal feed, for example a mixture of chicken, pork, sheep or goat Feed.
Table 1. Percentage of nutrients Lemma Minor of some sources

| Nutrient          | Source (%) | Average |
|-------------------|------------|---------|
|                   | A         | B       |        |
| Dry Matter        | -         | 6       | 4.93   | 5.42%  |
| Crude Protein     | -         | 20      | 29.9   | 23.24% |
| Calcium           | 1         | 1.1     |        | 1.3%   |
| Fosfor            | 1.4       | 0.5     | -      | 1.3%   |
| Crude Fat         | 4 – 6     | 3.8     | 5.33   | 3.43%  |
| Crude Fiber       | 7 – 10    | 16      | 9.6    | 11.53% |
| Ash               | 8 – 14    | 17      | 15     | 13.23% |

Source [4^A, 5^B, 6^C]

2. Materials and Method

The materials to be used in this research are:
- Lemma Minor
- Native chicken.
- Starter Feed and finisher feed.
- Trial Cage

2.1 Research design

The research model used in the study was a complete randomized design (CRD) with 5 treatments with 4 replications. The treatment provided is as follows:
- P0 = Control Feed (without addition of Lemma Minor)
- P1 = Feed with addition of Lemma Minor 5%
- P2 = Ration with the addition of Lemma Minor 10%
- P3 = Ration with the addition of Lemma Minor 15%
- P4 = Ration with the addition of Lemma Minor 20%

2.2 Research sites

This research was conducted in Klambir Lima Village. Hamparan Perak Sub-district. Deli Serdang Regency. North Sumatera Province.

Parameters observed
1. Average Feed Consumption
2. Average Increase of Body Weight
3. Average Feed Conversion

3. Results and Discussion

3.1. Daily Gain

Many factors influence the growth of livestock, especially native chicken. Native chicken is a local livestock with genetic ability to resist the surround environment. but relatively longer growth rate compared to other chicken livestock such as broiler Therefore, the Native chicken can utilize the available local feed sources to sustain their lives and to produce. The result of research that have been done by utilizing Lemma Minor on daily weight gain (g/head/day), ration consumption (g/head/day) and to feed conversion can seen in Based on Table 2.

Table 2 shows that the result of observation of average daily gain increase is not significant effect. It can also be said that the use of Lemma Minor with the use level 0% up to 20% in native chicken gave the same result. As it is known that Lemma Minor is a plant species that lives symbiosis with anabaena aziolae that can fix Nitrogen (N2) from air so it has high N and protein content [1]. Lemma Minor plant has a fairly high protein content of 28.12% dry weight [2]. while [3] indicated protein content in Lemma Minor sp of 23.42% Dry wt with a complete essential amino acid composition. This plant can be used for livestock feed as well as ruminants because of its high protein.
content. In addition to the high protein content as animal feed, but Lemna Minor also contains a high level of crude fiber is also high. according to the analysis of Biochemistry Nutrition Laboratory Faculty of Animal Husbandry University of Gajah Mada. the content of Lemna Minor flour is crude protein 17.95%. Crude fat 5.67% ash 28.95% crude fiber 18.74% and TDN 64.93%. This causes the addition of Lemna Minor to give the level of weight gain of different body is not real on the results of research observations.

Table 2. Recapitulation of Observation Results

| Treatment | Average Daily Gain | Feed Consumption | Feed Conversion |
|-----------|--------------------|------------------|-----------------|
| P0        | 11.53            | 47.45            | 4.12            |
| P1        | 11.56            | 47.07            | 4.08            |
| P2        | 11.94            | 47.10            | 3.96            |
| P3        | 11.30            | 46.82            | 4.15            |
| P4        | 11.19            | 46.62            | 4.18            |

Description: *= Show different results not real (Source data is processed)

3.2 Feed Consumption
The result of average daily gain is not significant effect in the observation results also caused by the level of consumption of animal feed itself. In the observation results, it is also seen that the level of feed consumption of Native chickens using Lemna Minor shows not significant effect it is caused by the level of palatability of Lemna Minor which is similar to other food ingredients also derived from local food sources Such as rice bran corn flour and onggok.

Table in general prefer feeds that contain low crude fiber. Factors that affect consumption is the nutritional quality and palatability of feed. Low palatability feed will be consumed in a limited way to meet the basic needs of livestock [7], fiber content in feed also affects feed consumption feed with high levels of high fiber have voluminous properties in livestock. Palatability affects the amount of feed consumption. High palatability feeds favored by livestock make increasing feed consumption, while low palatability feeds have relatively low feed intake [8].

Feed with high coarse fibers causes bulky properties, causing the rate of digestion in the slow rumen. The slow motion of digestion leads to lower feed intake because feed is in the rumen longer. Low-coarse grain feed material has a fast rate of digestion, so the feed can leave the rumen quickly and more feed in or consumed [9].

3.3. Feed Conversion
Feed conversion ratio (FCR) is a benchmark for assessing the efficiency of ration usage. The smaller the value of FCR, the higher the efficiency level of Feed use. The result of observation in this research is found that the feed conversion rate of native chicken shows not significant effect with addition lemna minor level 0% -20% feed conversion equal to 3.96 – 4.18.

Conversion of feed is the ratio between the amount of feed consumption and the increase of body weight [10]. Calculation of the conversion of native chicken ration can be seen in the Table 2. The smaller conversion value of the ration is more efficient to converting feed into the form of meat. The amount of feed consumed during the average maintenance period of 90 days from DOC (Day old Chick) to harvest is 4,231.10 grams per head for 90 days. [11] stated that the conversion of ration in 8 weeks old native chickens used rations with 17% and 20% protein content of 2.84 and 4.32.

[12] states that some of the major factors affecting the conversion of rations are genetic quality of rations diseases temperature cage sanitation ventilation treatment and cage management. Factors of rationing fighting also take effect in influencing the feed conversion the feed process in gastrointestinal tract the physical form of ration and the composition of nutritional rations. [13] opinion that the smaller the conversion of ration means the feeding of rations is more efficient but if the conversion of rations is enlarged then there has been wastage. According [10] feed conversion affected several factors such as the age of strain the nutritional content of the ration the state of temperature and state of livestock management and use of good seeds.
4. Conclusion

Based on the results of observations that have been carried out it can be concluded that the use of Lemna Minor as feed ingredients give a result that is not different from other conventional feed ingredients. The use of Lemna Minor can reduce/decrease cost of native chicken production due to the use of Lemna Minor does not require a large cost and easily obtained around paddy fields.

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