



RESEARCH ARTICLE.....

# Studies on supplementation of green Azolla (*Azolla pinnata*) on growth performance of Osmanabadi goat kids

S.D. TORADMAL, R.R. SHELKE, P.A. KAHATE AND K.U. BIDWE

**ABSTRACT.....** The present investigation on studies on supplementation of green Azolla (*Azolla pinnata*) on growth performance of Osmanabadi goat kids was conducted under Department of Animal Husbandry and Dairy Science, Post Graduate Institute, Dr. P.D.K.V., Akola for period of 60 day. Twenty goat kids between (3 to 6) month of age were divided into four groups on the basis of nearness to age and body weight as T<sub>1</sub> (Intensive feeding +Conc), T<sub>2</sub> (Intensive feeding +Conc.+100 g green Azolla), T<sub>3</sub> (Intensive feeding +Conc. +200 g green Azolla) and T<sub>4</sub> (Intensive feeding +Conc+300 g green Azolla), respectively. In intensive feeding dry, green and concentrate was provided as per thumb rule (ICAR, 1985) to all groups. The average daily dry matter intake per kid per day was higher in treatment T<sub>4</sub> (0.64kg) followed by T<sub>3</sub> (0.62kg), T<sub>2</sub> (0.58) and T<sub>1</sub> (0.57), respectively. The average daily gain in body weight of experimental kids was more in T<sub>4</sub> (0.098kg) followed by T<sub>3</sub> (0.087kg), T<sub>2</sub> (0.069kg) and less in T<sub>1</sub> (0.068kg). The average total gain in body measurement (chest girth, body length and body height) of kids which received green Azolla treatments showed significant effect with concentrate mixture. The total cost per day per kid for T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, were found to be Rs.6.98, 11.21, 15.11 and 19.01, respectively, but cost of feeding per kg body weight was found Rs.105.62, 106.46, 87.07 and 77.30, respectively. From the result it may be concluded that supplementation of green Azolla (*Azolla pinnata*) and concentrate in the diet is beneficial to increase body weight gain and health of the experimental goat kids.

**KEY WORDS.....** Intensive feeding, Azolla, Concentrate, Dry matter intake, Body weight gain, Body measurements, Economics

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## INTRODUCTION.....

Goat is a multi functional animal and plays a significant role in the economy and nutrition of landless, small and marginal farmers in the country. Goat rearing is an enterprise which has been practiced by a large section of population in rural areas. Goats can efficiently

survive on available shrubs and trees in adverse harsh environment in low fertility lands where no other crop can be grown. In pastoral and agricultural subsistence societies in India, goats are kept as a source of additional income and as an insurance against disaster. Goats are also used in ceremonial feasting and for the payment of

social dues. In addition to this, goat has religious and ritualistic importance in many societies.

Osmanabadi is a main goat breed of Maharashtra State. This breed is medium size and dual type of breed originated and habitat of Osmanabad district and its adjacent district of Maharashtra, Andhra Pradesh states. These goats are sturdy and having three kidding in two years. Average birth weight is approximately 2.5 to 3kg. And they are sold at the age of 8 to 9 months, *i.e.* 18 to 20 kg of body weight. Average meat yield is 40 to 45 per cent and milk production is 180 lits in 210 days of lactation period.

Aquatic plant free floating fern Azolla which belongs to the family Azollaceae is a good source of protein and it contains almost all essentials amino acids, mineral such as iron, calcium, magnesium, potassium, phosphorus, manganese etc., apart from appreciates quantities of vitamins A precursor beta-carotene and vitamins B<sub>12</sub>. It is also found to contain probiotics and biopolymers (Pillai *et al.*, 2002). Thus, Azolla appears to be a potential source of nutrients and has a considerably high feeding value (Hassiny *et al.*, 2008). Considering nutritional values of Azolla it was used as feed in broiler chicken (Balaji *et al.*, 2009), laying hens (Alalade *et al.*, 2007), goats (Tamang and Samanta, 1993) and buffalo calves (Indira *et al.*, 2009).

Hence, this investigation has been planned with main objectives to find out the optimum level of feeding green Azolla and its effect on growth performance and cost structure of Osmanabadi goat kids.

## RESEARCH METHODS.....

The present was conducted under Department of Animal Husbandry and Dairy Science, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth,

Akola for period of 60 day. Twenty goat kids between (3 to 6) month of age were divided into four groups on the basis of nearness to age and body weight as T<sub>1</sub> (Intensive feeding +Conc), T<sub>2</sub> (Intensive feeding +Conc.+100 g green Azolla), T<sub>3</sub> (Intensive feeding +Conc. +200 g green Azolla) and T<sub>4</sub> (Intensive feeding +Conc.+300 g green Azolla), respectively. In intensive feeding dry, green and concentrate was provided as per thumb rule (ICAR, 1985) to all groups.

The body weight of experimental goat kids was recorded at the start of experimental for 3 consecutive days and then at weekly interval. The daily feed intake per goat kid was recorded by providing feed as per treatments during morning and afternoon and subtracting the residue of the feed left in the next day morning. Along with body weight gain, following linear body measurement were taken at the end of each was period for knowing the increment in growth of experimental goat kids. The data obtained was subjected to the statistical analysis by following the Randomized Block Design (RBD) for testing their difference as per procedure described by Amble (1975).

## RESEARCH FINDINGS AND ANALYSIS.....

Dry matter is the most important component of the feeds and fodder. It excludes the moisture content of feed and fodder. The feed requirement of animal is based on the DM content of feed. The data obtained on mean daily dry matter intake in Osmanabadi goat kids in four different treatments is presented in Table 1.

The value of daily dry matter intake per 100 kg body weight of the treatment group T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were 4.00, 4.02, 4.05 and 4.12 kg, respectively. The daily dry matter intake (DMI) through roughages and concentrate with green Azolla was affected significantly

**Table 1 : Mean daily dry matter intake by experimental goat kids under different treatments (kg)**

Treatments	Average initial body weight (kg)	Average final body weight (kg)	Mean daily dry matter intake (kg)	Mean daily dry matter intake/100 kg body weight
T <sub>1</sub>	10.40	14.24	0.570	4.00
T <sub>2</sub>	10.50	14.40	0.580	4.02
T <sub>3</sub>	10.60	15.48	0.620	4.05
T <sub>4</sub>	10.45	15.95	0.640	4.12
F test	NS	Sig.	Sig.	Sig.
S.E.±	---	0.41	0.016	0.025
C.D. (P=0.05)	---	1.251	0.050	0.079

NS= Non-significant

( $P < 0.05$ ), (Table 1). The corresponding figure of per day dry matter intake of the treatment groups  $T_1$ ,  $T_2$ ,  $T_3$  and  $T_4$ , were 0.570, 0.580, 0.620 and 0.640 kg, respectively. The dry matter intake was noticed more in  $T_4$  followed by  $T_3$ ,  $T_2$  and  $T_1$ . It indicates the influence of incorporation of green Azolla and concentrate mixture improves the dry matter intake of the experimental goat kids.

Similar results were reported by Arieli *et al.* (1990) reported inclusion of Azolla meal in ration of sheep without having any adverse effect, Tamang and Samanth (1993) reported 20 per cent of Azolla meal in ration of goats without having any adverse effect. Wadhawani *et al.* (2007) reported 20 per cent of Azolla meal in ration of lambs without having any adverse effect. Dhage *et al.* (2007) reported 25 per cent of Azolla meal in ration of goats without having any adverse effect. Shital *et al.* (2011) reported that the average daily dry matter intake (0.35kg) per Osmanabadi kid was higher in 15 per cent concentrate was replaced with Azolla meal without any adverse effect. Bhilawade (2015) reported Azolla meal and concentrate mixture improves the dry matter intake.

### Growth performance of Osmanabadi goat kids:

The performance of goat kids by feeding green Azolla partially replaced for concentrate mixture, feeding

was judged in terms of body weight and body measurement.

### Body weight gain:

The data obtained in respect to body weight gain was tabulated and presented in Table 2.

The values observed for total gain in body weight per kid were 3.84, 3.90, 4.88 and 5.50 kg in treatments  $T_1$ ,  $T_2$ ,  $T_3$  and  $T_4$ , respectively. Also weekly gains in body weight per kid were 0.480, 0.487, 0.610 and 0.687 kg in treatment  $T_1$ ,  $T_2$ ,  $T_3$  and  $T_4$ , respectively. The variation among different treatments was found to be statistically significant ( $p < 0.05$ ). The body weight gain was significantly ( $p < 0.05$ ) higher in goat kids of treatment group  $T_4$ , followed by  $T_3$ ,  $T_2$  and  $T_1$ . Higher total gain was noticed in  $T_4$ . Indicated that supplementation of green Azolla increased the growth rate of experimental goat kids.

These observations are in agreement with findings of Dhage *et al.* (2007) reported 43.6 g daily gains in body weight of kids which agrees with present investigation. Similarly, Shital *et al.* (2012) also reported that there was an average total gain of 6.70 kg in Osmanabadi goat kids fed with 15 per cent level of Azolla meal. Ahmed *et al.* (2016) concluded that azolla can be added in the diet of growing sheep at 6 per cent level

**Table 2 : Body weight gain of goat kids under different treatments (kg)**

Treatments	Average initial weight (kg)	Average final weight (kg)	Total gain in body weight (kg)/kid	Weight gain kg/week/ goat kids(kg)	Weight gain kg/day/ goat kids(kg)
$T_1$	10.40	14.24	3.84	0.480	0.068
$T_2$	10.50	14.40	3.90	0.487	0.069
$T_3$	10.60	15.48	4.88	0.610	0.087
$T_4$	10.45	15.95	5.50	0.687	0.098
F test	NS	Sig.	Sig.	Sig.	Sig.
S.E. $\pm$	-	0.41	0.29	0.009	0.001
C.D. ( $P=0.05$ )	-	1.251	0.894	0.027	0.003

NS= Non-significant

**Table 3: Growth performance of in respect to body measurements under different treatments during experimental period (Mean of total gain)**

Treatments	Average gain in chest girth (cm.)	Average gain in length in (cm)	Average gain in height in (cm)
$T_1$	4.67	5.27	4.67
$T_2$	5.70	5.63	5.18
$T_3$	5.86	6.20	5.46
$T_4$	6.81	6.20	6.63
F test	Sig.	Sig.	Sig.
S.E. $\pm$	0.16	0.18	0.17
C.D. ( $P=0.05$ )	0.511	0.564	0.538

replacing linseed cake without any adverse effect on the performance of the animals.

### Body measurement:

The result obtained in terms of the chest girth, body length and body height were analyzed and tabulated in Table 3.

The initial chest girth vary with wider degree between treatments being 50.15, 50.62, 50.10 and 51.31 cm under T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, groups, respectively, which reached of a level to 55.22, 56.67, 56.77 and 58.31 at the end of the trial. As a result, the total gain in chest girth of the kids over the experimental period worked out to 4.67, 5.70, 5.86 and 6.81 cm under T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, groups, respectively. The total gain in body length was 5.27, 5.63, 6.20 and 6.20 cm in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, respectively. The total gain in body height at wither point was found to be 4.67, 5.18, 5.46 and 6.63 cm for the treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, respectively. It was noticed that body measurement such as length, height and chest girth showed increasing trends over an experimental period in all the treatments but variation among different treatment groups was found to be statistically significant.

These results are in agreement with results noted by Wadhawani *et al.* (2007) reported 20 per cent of Azolla meal in ration of lambs results beneficial for improvement of linear body measurements (Dhage *et al.*, 2007) reported 25 per cent of Azolla meal in ration of goats without having any adverse effect with well development in body length, height and chest girth. Shital

*et al.* (2012) observed an average daily gain in growth performance parameter (Body weight, height, length and chest girth) when Osmanabadi goat kids fed with Azolla.

### Conclusion:

The forgoing results and discussion leads to concluded that,. Significantly more dry matter (DM) intake were noticed in T<sub>4</sub> followed by T<sub>3</sub>, T<sub>2</sub> and T<sub>1</sub>. Maximum growth rate (weight gain) was obtained in T<sub>4</sub> by feeding of 300 g Azolla to the Osmanabadi goat kids. Body measurement (Chest girth, Body length, Body height) of goat kids which received Azolla showed significant effect.

Hence, it is concluded that growing Osmanabadi goat kids can be efficiently raised on feeding Azolla supplemented diet as evident from the increased dry matter intake which is resulted into significantly more body weight gain and also improving the health of experimental goat kids.

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