Original Research

Farmers' Centric Indigenous Duckling Production Technology in North and Middle Andaman, India

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Abstract

Need based programme and the concept of "Through farmers to farmers'' was planned and executed to address the issue of non-availability of ducklings in N&M Andaman. The concept empowered farmers to produce more ducklings through the scientific native duck farming with pond based elevated housing, balanced feeding and artificial incubation using community based mini incubator. In the present study, age of sexual maturity of 190.0±10.0 days, average body weight of 1290.0±40.0 grams at 14 weeks of age, annual egg production/duck of 195.0±5.0 numbers *with an average egg weight of 61.0±1.5 grams and hatchability of 40.9±5.6 per cent in Andaman local duck were recorded under scavenging conditions. The results revealed a significant ($p<0.05$) increase in availability of ducklings. This concept disseminated farmers' centric native duckling production technology of artificial incubation using mini incubator to the farmers in really remote areas of North and Middle Andaman and they sell ducklings @ Rs.35 per duckling.*

Key words: Community Based Mini Incubator, Native Duckling Production and N&M Andaman

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Introduction

Ducks rank second, next to chicken in the country in terms of total egg and meat production (Islam *et al.*, 2003). Ducks in A&N Islands are traditionally reared as family poultry under free range or semi range system. The geographical location, climate and environmental condition of these islands are favourable for successful duck production (Khanum *et al*., 2005). This is due to availability of natural feed resources in large areas of low lying and abundant marshy land and water logged areas (Valavan *et al*., 2009) where natural feed resources like aquatic weeds, various types of insects, tadpoles, earthworms, oysters, snails and crabs, a variety of small fishes, green forages and different fallen grains are available in plenty as good sources of nutrients for ducks. In addition, garden left over, insects, green grasses, kitchen wastes and all

other human refusal are better utilized for feeding ducks as ducks are efficient converter of agricultural by-products like seeds, grain and grain by-products.

The meat and egg of ducks are merely the major source of protein for the rural farmers residing in various isolated Andaman Islands and in particular, Bengali community is preferring duck as their choice of poultry. In A&N Islands, the current duck population is 97,287 out of which 76,197 are populated in N&M Andaman. The duck population is highly dense in North and Middle Andaman that is due to high population dense of Bengali farming community for whom duck farming provides self-employment for landless and small farmers. There was a great potentiality of improving the native duck farming in N&M Andaman with sustainable resource for ducklings that in-turn will improve food security and the economic status of BPL families in N&M Andaman (Pica-Ciamarra and Dhawan, 2010). However, their major constraint was non-availability of ducklings. Natural incubation provides less numbers of ducklings. Hence, the objective of this work was to promote the concept of ''by farmers to farmers'' through community based mini incubator which in turn facilitates availability of day-old ducklings at farmer's door steps and develops capacity for supplying day old ducklings to poultry farmers.

Materials and Methods

Baseline survey was conducted in Nimbudera, N&M Andaman to select the target farmers to establish demonstration units in collaboration with KVK, Nimbudera. A survey proforma was developed for this purpose. A total of 40 farmers were interviewed. Based on the report from baseline survey, the package of scientific technologies for native duck farming was developed comprising of-

1) Practice of elevated pond-based housing as housing at ground level is the major site to harbor infectious agents and water logging problem in rainy season causing unhygienic unhealthy condition to the birds;
2) Feeding technology on balanced feeding as there was no protein, vitamin and mineral supplementation;
3) Concept of 'by farmers to farmers' using mini incubator for artificial incubation of duck eggs: A total of 10 farmers were selected based on their involvement in the hatchery operation.

Community based mini hatching unit (Setter cum Hatcher of 120 eggs capacity) was established in KrishiVigyan Kendra, N&M Andaman along with construction of elevated pond-based duck shed to the beneficiaries). The data on body weight, mortality, age at first egg and egg production was collected. Capacity building programme and hands on training was imparted to educate the farmers on low cost balanced feeding to improve the native duck egg production and how to handle the mini incubator on community basis.Backward and forward linkage was established by this concept among the farmers by producing hatchable duck eggs and hatching by themselves and ducklings were distributed to other farmers. Through cluster approach, the slot was allotted to each farmer to hatch their own duck eggs at a time. The hatching eggs of indigenous ducks were set under setting conditions for 21 days and later shifted to hatching conditions. The critical factors of temperature, humidity and turning were monitored regularly as stated by

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Singh. R. A. (2001). The frequent power fluctuation was controlled by UPS. The total number of eggs set, percentage of live ducklings hatched based on total eggs set and infertile eggs was recorded. Egg break open study was carried out infertile eggs, early and late embryonic death was observed. The data was collected from the beneficiaries through semi structured interview schedule and the information was statistically analyzed as per the methods of Snedecor and Cochran (1994).

Results and Discussion

Base Line Survey

The results (Table 1) revealed that major sources of poultry are from duck farming for both eggs and meat. However, shortage of ducklings on routine basis was the major hurdle.

Table 1: Base line survey on duck farming of selected beneficiaries in Nimbudera of N&M Andaman

1	Average land holding	30 Bigha
2	Type of birds	Duck mainly local ducks and other Desi birds
3	Average size of family	4 numbers.
4	Education status	VIII – XII
5	Average no of hatchings per year	3
6	Male Female Ratio	1:5 (1 to 15)
7	Average Egg production %	180 eggs / duck / year
8	Hatchability %	40 - 70% natural hatching using broody hen
9	Feeding to duck	Rice & Wheat only
10	Feeding and watering management	No knowledge on protein feeding.
11	Brooding	Natural brooding
12	Housing	Crude type / no housing
13	Mortality	Severe mortality by outbreak of diseases 2-3 times in a year
14	Utilization pattern of eggs	Hatching/household consumption/few eggs are sold
15	Income from duck	Good income from duck
16	Major constrains	Unavailability of ducklings for small scale production of ducks

Information on Rural Duck Farming

As per the survey report of the present study, 100% of the interviewers expressed that duck farming is their family-oriented business that is being managed by family members only and it is one of family activities and only native ducks could be reared. All the beneficiaries expressed their loss of interest in rearing native ducks due to non-availability of native ducklings.

Adoption of Scientific Practices

All the adopted farmers constructed elevated pond-based housing for ducks adjacent to the pond in a farmer's participatory mode. The concept of "by farmers to farmers'' using community based mini

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incubator widened the source of ducklings. A chain was established among the farmers that are self-sustained for the ducklings.

Production Performance of Native Ducks of Andaman in Field

Production parameters have been tabulated (Table 2).

Adult Body Weight

Most of the adopted farmers (58.67%) recorded the adult body weight of 1290.0±40.0 grams at 14 weeks of age. Adult body weight of indigenous Andaman duck in the present study is lesser than the body weight of 1522.10±129.35g of indigenous Nageshwari ducks at 12 weeks of age (Morduzzaman *et al*., 2015). However, Islam *et al*. (2012) and Mahanta *et al*. (2009) have recorded comparatively lesser body weight of 514.25, 643.00, 703.00 and 1054.63 g of Campbell, Jinding, Deshi duck and Charachemballi at 12 weeks of age respectively under free range condition. It is illustrated from this data of the present study that this indigenous Andaman duck is medium sized duck as compared to findings with Nageswari duck and other egg producing exotic breed (Khaki Campbell and Jinding).

Age at Sexual Maturity (ASM)

The age at first egg production of Andaman native ducks was 190.0±10.0 days. This report on ASM was also opined by the findings of Sharma *et al*. (2003). In other studies, Zaman *et al*. (2005) and lslam *et al*. (2002) reported that average ASM of Nageswari duck was 188 days with a range of 174-198 days and 180-195 days respectively. In contrary, the present findings on age at sexual maturity is late as compared to the reports of Morduzzaman *et al*. (2015) in desi ducks. This might be due to genetic difference and scavenging feed base resource under scavenging system.

Egg Production

The annual total egg production recorded in the present study was higher than the reports by Mahanta *et al*. (2001), Islam *et al*. (2002) and Sharma *et al*. (2003) in desi Nageswari ducks under extensive system. Further, reports of Morduzzaman *et al*. (2015) and Valavan *et al*. (2009) give scope for egg production ranging from 200 to 220 in desi ducks under intensive management. Chara and Chemballi ducks of Kerala have reported the egg numbers of 125 eggs (Mahanta *et al*., 1998) which again indicates the genotypic difference for this variation.

Egg Weight and Breeding Ratio

The mean egg weight was recorded as 61.22±0.54 g in the present study. Similar egg weight has been recorded by Sharma *et al*. (2002) in Nageswari duck. In contrary, the egg weight of native duck of Andaman is lower than the Chara chemballi duck of Assam (Mahanta *et al*., 2009) wherein they reported the average

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egg weight of 71.6 g. The average breeding ratio was found to be 1.7±0.05. This finding of this study is varying from the reports of Zaman *et al*. (2005) and Islam *et al.* (2002) who reported male and female ratio of 1:5 in Nageswari duck and Mahanta *et al*. (2001) reported as 1:6 in the same duck breed of Assam.

Table 2: Production parameters observed in native ducks in the study area

Adult body weight (kg) (Drake) at 14 weeks of age	1.330 ± 0.42
Adult body weight (kg) (Duck) at 14 weeks of age	1.259 ± 0.25
Livability during growing period	91.33%
Age at sexual maturity	*190.0±10.0*
Breeding ratio	1.7±0.05
Annual egg production	195.0±5.0 numbers

Reproduction Performance

A total of 14 batches of hatchable eggs of indigenous Andaman ducks were successfully hatched out. The mean fertility percent, early and late embryonic death, hatchability on total and fertile eggs basis were 53.02%, 7.83 % 9.96 %, 40.9% and 57.8% respectively. The low hatchability percentage with indigenous duck eggs in this community incubator than the commercial incubator was mainly attributed by higher infertility percentage (46.98%) with indigenous duck eggs set by the farmers. Lacking of balanced feeding for breeders, improper breeding ratio and their adult body weight difference and farmer's nature of keeping drake for long at field might be contributing to the low fertility percentage. Inbreeding might be the contributing factor for decreasing the fertility and thereby the hatchability percentage (Marais, 1965). Further, hatchable egg storage of 7days at 13^{o}C is highly impossible in the farmer's field before setting and hence, long storage at room temperature would have resulted in early embryonic mortality. The same reason was opined by result of Saha *et al*. (1992) who recorded higher embryonic mortality with 7 days pre-incubation holding period and lower with 3 days pre-incubation holding period. Hatching of weak ducklings reported in the present study might be due to poor and insufficient pre-incubation of hatching eggs (Arora and Arnija, 1972). He reported better embryonic development in the eggs subjected to 3 days pre incubation period. Late embryonic death might be attributed by uneven power cuts in the night and temperature fluctuation beyond the capacity of UPS.

Impact of Concept of "by farmers to farmers" at Duckling Production Unit

The duckling resource unit with the concept of "by farmers to farmers'' has imparted knowledge and skill development on handling of community mini incubator. In this ways, self-sustained concept of ''by farmers to farmers'' has become successful. The major constraint in indigenous duck farming was the non-availability of ducklings in N&M Andaman and that has been eliminated by this concept. A total of 10 farmers have established mini incubator, started their own poultry farm including indigenous ducks and selling ducklings and chick (Table 3).

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Table 3: Impact of concept of "by farmers to farmers" in duckling production unit

Particulars	Before mini incubator	After mini incubator	Increase in ducklings/ chick's availability
Unit size of farm	420	1186	2.82 folds*
source of chicks	Govt. poultry farm (Rs. 23/ chick)	own	
Hatchability	Nil	64%*	
Total birds sold	Nil	630*	

Significant

The capacity building programme played significant role in empowering the farmers technically sound in handling of incubator. Impact on socio economic trait under present conditions is paramount important to be evaluated by Govt. organizations for policy making. A pilot effort was made in this study for alleviating the constraint in getting indigenous ducklings. The availability of ducklings has increased to 2.82 times per month per person among 92.50% of beneficiaries (Table 4). This work has widespread impact motivating famers to adopt the community mini incubator on their own to establish small scale business of supplying chicks to other farmers. This clearly indicated that the socio-economic status has direct relationship with this community mini incubator to the underprivileged farmers of N&M Andaman.

Conclusion

Andaman local ducks are predominant in North & Middle Andaman Islands. These ducks could be further characterised for national conservation program. The concept of ''by farmers to farmers'' using ccommunity based mini incubator would be best recommended to alleviate the problem of unavailability of ducklings and for mass propagation of these native Andaman ducks at field level.

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