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Influence of Food grains on the Growth of Pigeon (*Columba livia*), Periyakulam, Theni District, Tamil Nadu, India

Thamaraiselvi V.P. and Nirmala T
PG and Research Center of Zoology Jayaraj Annapackiam College for Women, Periyakulam, Tamil Nadu, INDIA

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Abstract

Genetic trait and management influences the growth of the birds. Three pairs of Columba livia bird species were studied at the age of 4 weeks. These experimental birds were in a separate cage and fed on Millet, Ragi and Corn for six months. Weight gain takes place in Corn fed female C. livia. Highest growth was observed in the female C. livia fed on Corn and the lowest in male C. livia fed on Millet. Food Consumption Food Assimilation, Food Conversion, Food Metabolized, Feeding Rate, Conversion Rate, Assimilation Efficiency, Gross conversion and Efficiency Net Efficiency also high in January and low in June.

Keywords: *Columba livia*, millet, ragi, corn, food and growth.

Introduction

Birds play an important role in agriculture by feeding on insects, rodents, pests of crops help in the dispersal of seeds and cross pollination in the flowers of many plant species[1]. The granivorous and omnivorous are helpful to man by increasing agricultural production by means of eating up the insects and rodent pest of crops. There are about 1200 species of birds in the Indian subcontinent at least 150 of them are reported to feed on seeds and fruits of different crops[2]. The insectivorous and carnivorous species are considered to be useful to agriculture since they keep a very potent check on population of insects and rodent pests of crops.

Columba livia, the domesticated amongst all the birds from the ancient days[3]. They have been used to carry messages and they res used as food source, sport, aviary specimen and as household pets. *Columba livia* has had a long and colorful history in the service of man. Earliest records indicate that man had a deep interest in the breeding of Pigeons. Mans efforts at breeding and selection soon gave him Pigeons with different colors, shapes, sizes and abilities.

Columba livia have been widely used to carry messages, especially in times of war. They are employed in rescue work and have been used to carry messages from ships to nearby land areas. Pigeons have been used by "underground" movements and persons engaged in submersive activities where other forms of communication could be traced[4]. Pigeons have been one of man's closest associate for more than 4,000 years. They perform many useful functions. In addition, they have many qualities that make them useful for laboratory and research purposes. Some of the varieties of *Columba livia* have been selected for fancy colors. *Columba livia* readily adapt them to living under a great variety of conditions. Their diet is simple.

Columba livia are commonly found in areas having old and new buildings, bridges, roadsides, old towns, paved areas, parks, gardens, farmyards, grain elevators, feed mills and in agricultural fields, in all these places they vary in size, shape and condition to provide suitable habitat for the Pigeon. The population of the Pigeon has increacd because of the availability of food by human source and seasonally[5].

Food consumption is about one-tenth of the *Columba livia* body weight and will range from 20-100 g daily, depending on the strain. Under laboratory conditions, particularly for small number of caged birds, the feeding of a pelleted Pigeon feed (readily available commercially) is by far the most satisfactory procedure to follow. Sturtevant and Hollander, 1978 also suggested that vitamin-mineral supplement is usually also fed, but granite grit is not essential with pelleted rations, although oyster shell must be provided for breeders. The periodic feeding of some mixed whole grain is said to be good practice, in order to exercise the gizzard[7-10].

Columba livia have excellent visual capabilities, which is why there're particularly used for investigations of visual, categorization processes[11]. As pigeons have sophisticated colour vision, they may use colour cues for discrimination of 'good' foods[12]. *Columba livia* have more than four cone classes in their retina[13], located at the back of the eye[14-15]. A low quality diet, poor in nutrients may reduce growth rates in the nestling stage of passerines[16-17]. Hence in the present investigation it is much more evident that there is little or no work has been done in recent years on the feeding and growth rate *Columba livia.* Therefore an attempt has been made to study the "Influence of food grains on the growth of Pigeon (*Columba livia*)".

Methodology

Biology of the *Columba livia*: *Columba livia* exhibit considerable variations in size. *Columbia livia* typically have a gray body with a whitish rump, two black bars on the secondary

wing feathers, a broad black band on the tail, and red feet. Body color can vary from gray to white, tan and black. The average weight is 13 ounces (369 g) and the average length is 11 inches (28 cm). *Columba livia* feeds on grains, seeds, small insects and the spilled foods. Require 30 ml of water daily.

Experimental design: *Columba livia* bird species were selected for the study at the age of 4 weeks from a commercial farm at Madurai. The birds were kept in cages *(*Length 60cm x Width 105cm x Height 75cm^3*)* with fiber bedding in access to *Columba livia.* The birds were fed on starter food and water. The enough water was kept for the birds in dishes in the cage. The water was changed every day to keep it fresh and clean. Initial weights, of the birds were taken using birds weighing balance. After they were introduced into separate iron cages, the feeding period of the experimental birds were observed for six months from January to June, 2014. The experimental birds were segregated as three pairs of *Columba livia*. Each pair of experimental birds in a separate cage was fed on Millet, Ragi and Corn. The feed was given to the birds at 7 am each day and was observed. The excreta and the unfed grains were collected each day and it is weighed to calculate the assimilation rate. Each month the birds were weighed to know the body mass gain fed on different grains.

Statistical analysis: The results were subjected to statistical treatment for food consumption, assimilation conversion, metabolism, feeding rate, conversion rate, assimilation efficiency, net efficiency. The scheme of energy value is expressed by the following IBP formula usually represented as $C = P + R + F + U$[18].

Results and Discussion

The growth per weight in gram of *Columba livia* increased gradually during the study period. The heist growth in June in all the experimental birds fed on Millet, Ragi and Corn. In both the sexes, growth was high in the birds fed on Corn and low on Millet. Among the male and female of *C. livia* fed on Millet, the growth was high in the female bird species (table -1). Similar results were observed in the birds fed on Ragi and Corn, the female has the highest value than the male bird. Highest growth was observed in the female *C. livia* fed on Corn and the lowest growth was observed in male *C. livia* fed on Millet.

Food Consumption: The food consumption was low in January and high in June. The food consumed by the birds increased, as there was increase in the days of feeding of both the bird species (figure-1). It may be due to the acclimatization of birds, seasonal changes and energetic reason as in the study of Harject *et al.*[19] in parakeets. Similar observations were made by Karthiga[20]. In *C. livia* the food consumed was high in the birds fed on Ragi whereas it was low in the birds fed on Millet. *C livia* showed high food consumption of Ragi followed by Corn and Millet.

Food Assimilation: The food Assimilation in *C. livia* was low in January and it was high in June (figure-2). In *C. livia* the assimilation was high with Ragi and low with Millet. All the three showed the highest value of assimilation in *C. livia* fed on Ragi. Bhanja *et al.*[21] and Karthiga[20] studied that Millet coriander leaf was highly preferred and assimilated by the Love birds. They reported that by products which are cheap and plenty can be better utilized successfully in poultry as an energy source to replace costly ingredients.

Food conversion: Food conversion of *C. livia* was observed and recorded each month and it showed increases of food conversion steadily during the study period (figure-3). The food conversion of *C. livia* was high with Corn and low with Ragi. Food consumption and assimilation of *C. livia* was whereas high in high with Ragi, the conversion was low with Ragi. These values were in agreement with those given by Makarajothi[22].

Table-1
Weight gain in grams male and female *Columba livia* in different grains from January to June 2014

Months	Millet		Ragi		Corn	
	Male	Female	Male	Female	Male	Female
Initial Weight	42	39	45	40	47	44
January	68	70	70	71	72	74
February	88	90	92	93	95	98
March	120	130	130	132	136	148
April	165	161	160	160	174	180
May	205	210	224	232	238	243
June	222	228	239	244	243	255

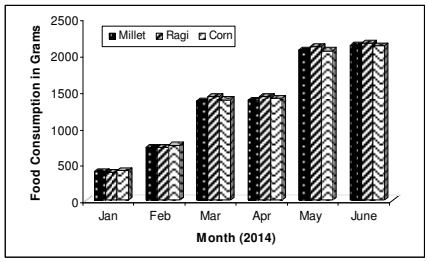

Figure-1
Food Consumption of *C. livia* on different food grains from January to June 2014

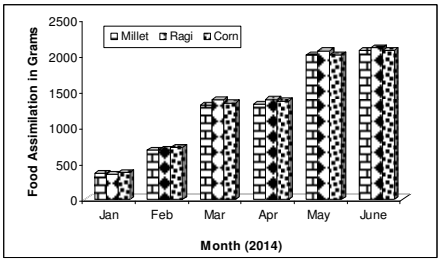

Figure-2
Food Assimilation of *C. livia* on different food grains from January to June 2014

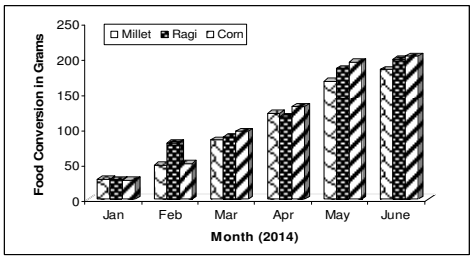

Figure-3
Food Conversion of *C. livia* on different food grains from January to June 2014

Food Metabolism: Food metabolism was high in June and low in January with little difference between March and April and May and June. There was a steady increase from January to June in the *C. livia* (figure-4). The food metabolism was high in Ragi consumed by *C. livia.* In *C. livia,* though the food conversion was high in corn the metabolism was the lowest in Corn, the highest metabolism was observed in *C. livia* fed by Ragi. Compared with *C. livia.* Karthiga[20] reported that metabolism was high in Millet – rice food but in this study it is in Corn followed by Ragi. Feeding rates observed that high metabolic rates of caged starlings Jeifer *et al.*[23].

Feeding Rate: Feeding rate gradually increased from January to June. High feeding rate was recorded in June and low feeding rate was observed in January (figure-5). *C. livia* preferred Ragi more than Millet and Corn. The feeding rate was high in Ragi followed by Millet in *C. livia a*nd poor feeding was observed in Corn[23], studied the feeding rate of caged starlings, the feeding rate of the birds increased as there was increase in days of feeding. Leising *et al*.[24] reported that *C. livia* preferred coloured foods as they have more than other foods.

Conversion Rate: Conversion rate was high during the month of June and low in January. There was a steady increase of conversion exist in both the bird species (figure-7). The conversion rate of *C. livia* was high in Millet and less in Ragi. The pattern of weight gain values varied with the type of food supplied to the birds. Similar observations were found in the works of Stephenson *et al.*[25], Makarajothi[22] and Karthiga[20]. Guill and Washburn[26], reported that the food Conversion rate varied with fluctuation in the outside temperature in broilers.

Assimilation Rate: Figure-6 depicts the assimilation rate of *C. livia* and it was clearly evident that the assimilation rate was high in June and low in January. In *C. livia* the rate of assimilation was high in Millet and low in Corn. Though the feeding rate was high in Ragi fed *C. livia*, it showed a decreased value in the rate of Assimilation. Moreover, feeding rate as well as assimilation rate of *C. livia* fed on Corn showed the lowest value. Similar observations were found in the works of Stephenson *et al.*[25]. Growth of Indian River broiler chicks was significantly influenced by the type of food as in the study of Makarajothi[22], where the growth was variable in different food.

Assimilation Efficiency: The assimilation efficiency was high in June and low in January (figure-8). The highest assimilation efficiency was observed in Millet followed by Corn, and Ragi. The assimilation and conversion depend upon the nature of quantity and quality of food as in the study of Karthiga[20].

Gross Conversion Efficiency: Gross conversion efficiency in *C. livia* showed an increase from January to June (figure-9). In *C. livia* the gross conversion efficiency was high in Corn and low in Millet. *C. livia* was in Corn and Ragi was recorded as the lowest. The gross conversion efficiency depends upon the nature of temperature variation, as in the study made by Karthiga[20].

Net Conversion Efficiency: This may be due to the species difference and weight variation. Net Conversion Efficiency was low in Millet fed *C. livia* (figure-10). The highest net conversion efficiency recorded in Corn fed *C. livia*. Different feeding trials in chick, done by Makarajothi[20], revealed the fact that body weight gain was positively and negatively correlated with food conversion, food metabolized, feeding rate, gross conversion, net conversion and assimilation efficiencies.

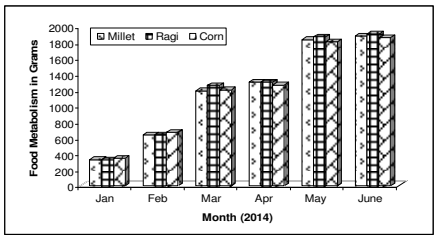

Figure-4
Food Metabolism of *C. livia* on different food grains from January to June 2014

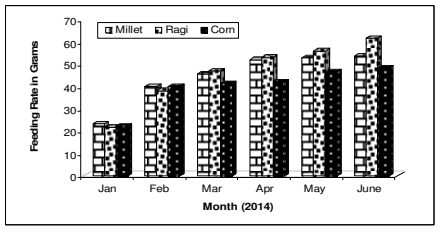

Figure-5
Feeding Rate of *C. livia* on different food grains from January to June 2014

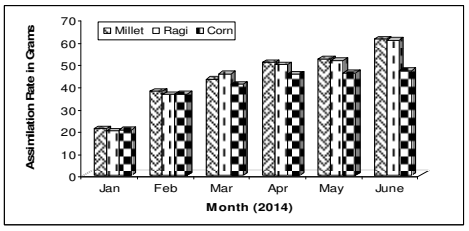

Figure-6
Assimilation Rate of *C. livia* on different food grains from January to June 2014

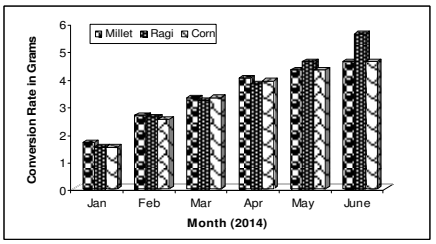

Figure-7
Conversion Rate of *C. livia* on different food grains from January to June 2014

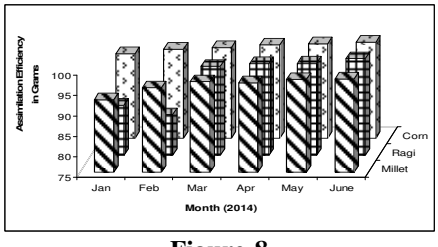

Figure-8
Assimilation Efficiency of *C. livia* on different food grains from January to June 2014

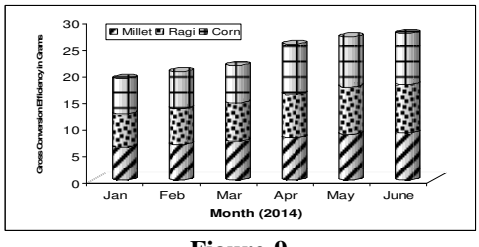

Figure-9
Gross Conversion Efficiency of *C. livia* on different food grains from January to June 2014

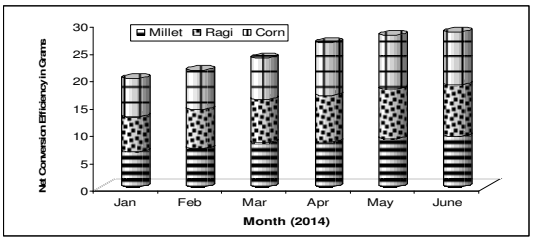

Figure-10
Net Conversion Efficiency of *C. livia* on different food grains from January to June 2014

Conclusion

It was observed that highest growth of Corn fed female *C. livia* and it was low in Millet fed male bird species. The weight of the *C. livia* gradually increased from January to June. Food consumption, Food assimilation, Food metabolism, Feeding rate and Conversion rate also high in Ragi fed bird species. Gross conversion efficiency and Net conversion efficiency is gradually increased in all the food grains.

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