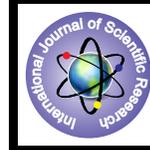


Growth Of Various Morphometric Parameters Of The Nestling In Common Myna (*Acridotheres Tristis*)



Zoology

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ABSTRACT

Breeding activity in Common Myna is March which lasted up to August. Weight was the fastest growing parameter, which reached approximate to that of adult size in 15 days, followed by wing and body length reaching approximately 90% of the adult size at the age of 21.57 and 15 days respectively. Tail did not begin to grow until the day 9, but it reached 90% of asymptotic size within 14.76 days. Tarsus was next to tail in growth and it acquired 90% of growth in 14.89 days. Maturation of structures associated with flight (i.e., tail and wing) was relatively slow, but soon reached at 90% of adult size after fledgling. Middle toe is the next parameter acquiring 90% of growth in 9.35 days. Bill was the slowest growing structure with a slowest growth constant rate of 0.0611.

INTRODUCTION:-

Common Myna (*Acridotheres tristis*) is one of the common birds found all over tropical the Asian countries, classified in order Passeriformes and Family Sturnidae (Ali *et al.* 1983). Common Mynas is a very familiar bird and its adaptation to human environments has made very successful (Baker *et al.* 1979). Common Mynas like most starlings is omnivorous and its diet consists of insects, small vertebrates, carrion, fruits, grains, and occasionally on eggs and the nestlings of other birds (Julka 1983). They commonly breed between March to September, can lay up to three clutches of eggs in one season (Pell *et al.* 1997).

STUDY AREA:-

The study was confined to Junagadh city a District head-quarter and a picturesque town, which was the former capital of the Princely State of Junagadh. The Junagadh city is located between latitudes 21° 31' N and 70° 49' E. The city is a gate way to famous Gir Forest which is the natural habitat for the last existing population of Asiatic Lion in the wild. Apart from Gir, there is Girnar Ranges, Barda Hills and extensive grasslands known as Vidis, which also support a variety of wildlife especially avifauna.

Junagadh has a tropical monsoon climate with three distinct seasons i.e., monsoon, winter and summer.

MATERIAL AND METHOD:-

Growth characterization

The growth of various body parts of the nestling such as, tarsus, wing primary, bill, middle toe and tail were measured weekly using vernier calipers, divider and ruler (Ali and Ripley 2001-Vol.1). Each chick of a brood was individually marked using color plastic rings fitted in tarsus. Marking was also done at finger portion using permanent marker. Increments in growth of various body parts were plotted against age of chick (days) and growth curves were fitted using Gompertz growth equation (Ricklefs 1967) as mentioned below:

$$W_{(t)} = A_{\exp} \{-\exp [(-k (t-i))]\}$$

Here, $W(t)$, is length (cm) at age t (days), A is the asymptote of growth curve (cm), i is the age at inflection point (days) and k is growth rate constant (days^{-1}).

Time required for growth from 10 to 90 % of asymptote (t_{10-90}) was also calculated for comparison of growth of different body parts using the formula given by Ricklefs (1967) as given below:

$$t_{10} - t_{90} = (C_{90} - C_{10}) / (dw/dt)$$

Where, C_{10} and C_{90} are conversion factors at 10% and 90% of asymptotic growth and slope of above mentioned curve dw/dt are the growth rate. Adult myna was capture during breeding season in June and July in its nest.

RESULTS AND DISCUSSION:-

Common Myna in present study initiated breeding activity in March which lasted up to August, extending over a period of six

months. In Common Myna first phase of an intensive breeding activity was recorded from mid to the end of May and the second in mid June (in 2007). Same pattern was observed with minor changes in 2008.

Growth of morphometric parameters

Various body structures of Common Myna chick developed at different rates. Weight was the fastest growing parameter, which reached approximate to that of adult size in 15 days, followed by wing and body length reaching approximately 90% of the adult size at the age of 21.57 and 15 days respectively (Table 1). Comparison of ratio of size at weight at fledgling to adult size showed that Common Myna remained relatively under developed at fledgling stage. This affect the fledgling time, as the Common Myna chicks fledged on an average at 24 - 25 days, a hypothesis in this context, proposed from the observation is, Common Myna had adapted themselves to the urban landscape and city area, which are colonial breeders. Thus a chance of predation increases several folds both to adult and fledglings in Common Myna, thus fledgling time can be considered as anti-predatory tactics, to ensure the future of the species.

The growth of chicks is influenced by various intrinsic and extrinsic factors (Ricklefs 1968, 1969, 1973). Abundance of food has been proved to be the major factor affecting the growth of chicks (Quinney *et al.* 1986). Besides, the variation in growth of chicks has often been correlated with quality and quantity of food supplied by parents to them (Ricklefs *et al.* 1985, 1987; Ross 1980 and Poole 1982). Within a brood, hatching order influences the growth rate. Asynchronous hatching produces initial size differences among brood members. Due to that a general hierarchy in growth is observed, in which the senior most chick achieves faster growth than the juniors (Werschkul 1979; Zach 1982; Fujioka 1984; Mock 1985; Drummond *et al.* 1986; Bollinger *et al.* 1990). The youngest chick grows a significantly lower rate and; is most likely to die when food becomes scarce.

Tail did not begin to grow until the day 9, but it reached 90% of asymptotic size within 14.76 days. It reached 90% of adult size in 22.73 days of age which is almost the fledgling time (Table 1). Tarsus was next to tail in growth and it acquired 90% of growth in 14.89 days and 90% of adult size in 19 days (Table 1). Maturation of structures associated with flight (i.e., tail and wing) was relatively slow, but soon reached at 90% of adult size after fledgling. This further provides evidence for addictiveness of differential maturation of body components as it has little function until fledgling. Tail growth began later and proceeds faster than wing but reached at similar stage of development at the time of fledgling as both are essential for flight.

Middle toe is the next parameter acquiring 90% of growth in 9.35 days and 90% of adult size in 13.7 days. Bill was the slowest growing structure with a slowest growth constant rate of 0.0611 (Table 1). Bill was the slowest growing structure. Initial small size of bill may facilitate nestlings to gape into parent's mouth for feeding. More over slow growth of bill may be associated with gradual increment in foraging proficiency. Growth

rate of middle toe and tarsus was slow.

Graphical representation of growth parameters for various body parts of Common Myna are given in Figures 1. Age of one day old chick have a average weight of 5.28g. and their body length 61.5mm, bill length 4.9mm, tarsus 9.1mm, middle toe 10.8mm are there and one day chick have wing 18mm, whereas tail do not grow.

Similarly for nine day old chick weight increases 5.28g to 35.55g. That same way growth rate of body length 61.5mm increases to 120.3mm, means that growth is 58.8mm respectively. In wing growth during 9th day increases 18.8mm into 45.9mm, meaning that wing growth is 27.1mm during 9th day chick. Tail does not growth during 9th day but in 10th day growth of tail is 10.5mm.

During 18 to 23 day growth of body weight, body length, bill, tarsus, middle toe does not vary significantly. Bill lengh (20.3mm) in 23th day, tarsus (40mm) in 22th day, middle toe (29.7mm) in 17th day is constant.

During 24th day weight 80.17g, body length 182.8mm, bill length 20.3mm, tarsus length 40mm, middle toe length 29.7mm, wing length 134mm, tail length 79.2mm are found (Fig. 1).

The pattern of growth in birds is related to adaptive response of each species to its ecological requirements (Ricklefs 1968, 1969, 1973, 1975). Kushlan (1977c) found out that in young American White Ibises the “structures associated with terrestrial locomotion” grows more rapidly than those “associated with flight”. That means the growth of various body parts of chicks shows differential maturation. This is an essential ecological adaptation (Ricklef 1975, O’Conner 1977). Excepting the American White Ibis (Kushlan 1977c) and Indian Black Ibis (Vyas 1996; Chavda 1997), there is no sufficient information available regarding the family *Threskiornithidae*. In the present study the growth of chicks of mynas is thoroughly investigated.

Table 1Growth of various morphometric parameters of Common Myna.

S.N.	Body part	Growth constant (k)	Asymptotic size A (mm)	$t_{0.90}$ (days)	Age at 90% of adult size (days)	Ratio of size at fledgling to adult size
1	Body length	0.4952	174.7	12	15	0.95
2	Bill	0.0611	20.0	14.63	12.2	0.98
3	Tarsus	0.1505	40.0	14.89	19	1
4	Middle toe	0.1007	29.7	9.35	13.7	1
5	Wing	0.511	134.0	11.47	21.57	1
6	Tail	0.3679	79.0	14.76	22.73	0.98
7	Weight	3.8387	789.1	7.38	15	0.98

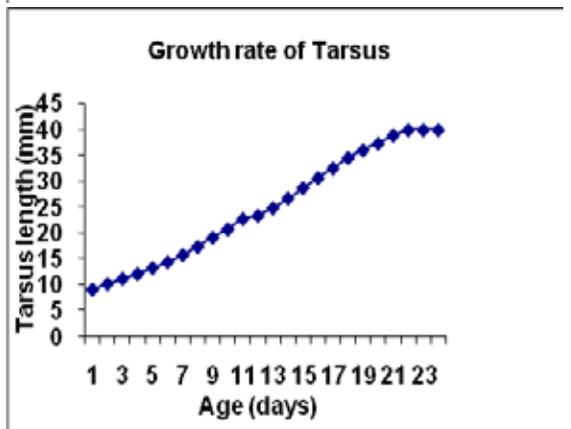
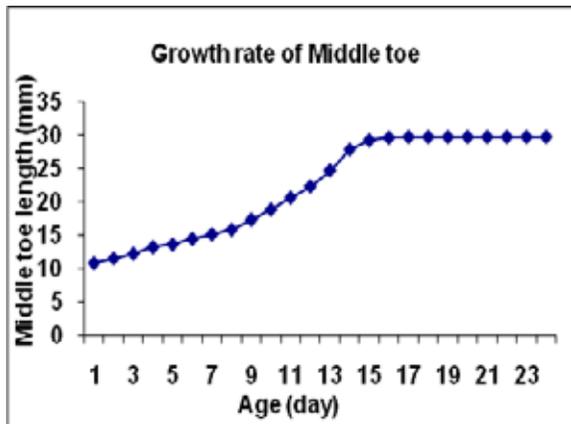
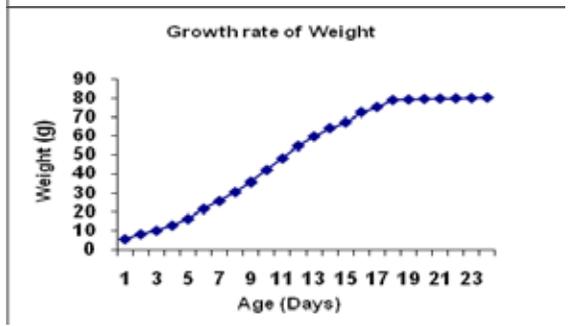
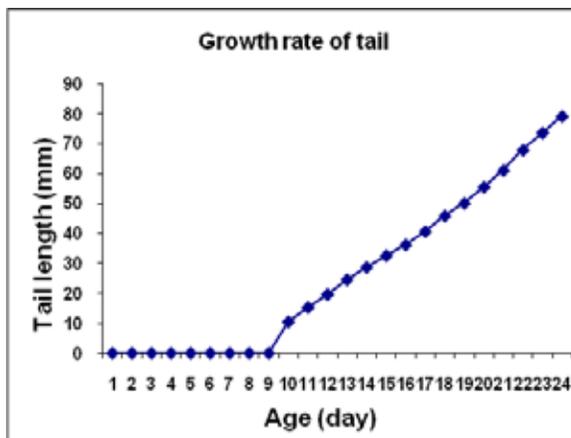
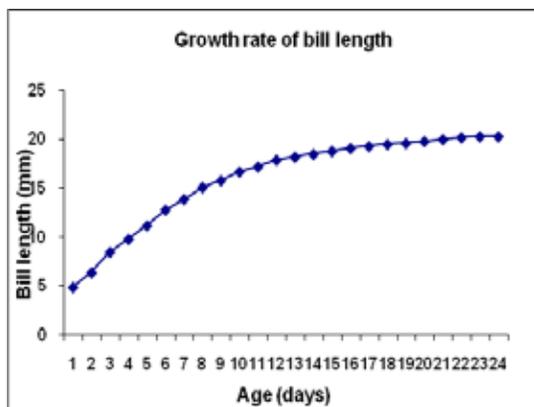


Fig. 1 Growth of various morphometric parameters of Common Myna (n=10 Chick).

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