SECTION - C

DEHYDRATED BEEF AS A GROWTH PROMOTER IN CHICKS
In the evolution of animal species, one important correlation achieved is the adjustment of breeding periods to such seasons as would ensure adequate food supplies to the growing young. In the case of the aquatic birds nesting in the bird sanctuaries at Rangan Thittu and Vedan Thangal in South India, the breeding time is when flood waters in the reservoirs provide rich supplies of animal food to the young ones. On the other hand the field sparrows which subsist on paddy or field grass seeds and ground insects, raise their fledglings later in the year during the dry months when their food supply will be available in plenty.

Even when adequate food supply is ensured for the young, mortality is high in the growing stages of birds. The most important aspect in juvenile feed is a balanced diet to minimise mortality. A balanced diet for the young among other things should include an adequate supply of animal proteins. Various species of birds have ensured a supply of animal food to their young by different types of adjustment. Steward (1956) reported that the food of the newly-hatched young ones of ruffled grouse consisted of 91 per cent insect material and 9 per cent plant stuff, though in later stages more and more plant food was included in the diet. Kalmbach (1958) found that the young ones of
house sparrow were fed with 68 per cent animal matter and the remaining vegetable stuff, whereas the adult food consisted of not more than 5 per cent of animal matter.

A unique mode of feeding the young has been evolved among the pigeons and doves. The breeding adults of these birds, both male and female elaborate a rich food known as crop-milk with which they feed their young. The crop-milk is a secretion similar to the mammary gland secretion of mammals resulting from the enzymic breakdown of the secretory cells of the crop. Hegde (1970) found that the pigeon-squab attained 39 times its own initial weight as a result of four week's feeding with the crop-milk. A much more pronounced growth has been reported by Portmann (1950) in the case of the young cuckoo which weigh 2 g. at hatching time attained a weight of 100 g. in three weeks. Portmann concludes that in addition to the animal proteins provided in the diet in the form of insects in many nidicolous birds like the cuckoo, their organs of alimentation including the liver are proportionately better developed in these birds, which according to him aid in bringing about the phenomenal growth.
The young of gallinaceous birds though hatched out in a precocial stage are also insect-fed to a great extent. The jungle fowl young ones feed on ground insects, especially termites which are met with in abundance in the bamboo forests, the haunts of jungle fowls. The domestic fowl has been derived from jungle fowl, genetically selected for continuous reproduction. If animal feed is essential for the jungle fowl young ones, it is all the more so for the domestic chicks. In the Department of Zoology of the Karnatak University, chick feed is prepared in accordance with the aim of the recommendations of the National Research Council of the United States, Published in their booklet, revised edition, 1966; this feed mix ensures at least 20 per cent of proteins. The ingredients used are Hindleaver Poultry Concentrate, 200 parts; yellow ground maize, 100 parts; rice polish, 100 parts. This mixture was found to contain 20 to 21 per cent protein, part of which is of animal origin from fish meal included in the poultry concentrate.

Since it was known that beef protein accelerates growth, we thought it would be advisable to find out whether dehydrated beef powder added to the normal diet of chicks would result in better growth. A feeding trial was therefore attempted as outlined under material and methods.
Table 1: Individual weights of chicks

<table>
<thead>
<tr>
<th>No.</th>
<th>Controls</th>
<th></th>
<th></th>
<th>Experiments</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>135</td>
<td>348</td>
<td>136</td>
<td>384</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>192</td>
<td>508</td>
<td>152</td>
<td>485</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>175</td>
<td>439</td>
<td>167</td>
<td>545</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>182</td>
<td>456</td>
<td>165</td>
<td>549</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>144</td>
<td>378</td>
<td>144</td>
<td>382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>145</td>
<td>382</td>
<td>155</td>
<td>521</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>137</td>
<td>329</td>
<td>160</td>
<td>515</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>142</td>
<td>348</td>
<td>165</td>
<td>512</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>154</td>
<td>455</td>
<td>166</td>
<td>523</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>182</td>
<td>432</td>
<td>148</td>
<td>498</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>165</td>
<td>465</td>
<td>144</td>
<td>381</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>174</td>
<td>408</td>
<td>152</td>
<td>497</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>165</td>
<td>454</td>
<td>152</td>
<td>484</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>152</td>
<td>427</td>
<td>140</td>
<td>415</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>149</td>
<td>410</td>
<td>139</td>
<td>372</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>159</td>
<td>491</td>
<td>155</td>
<td>442</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>164</td>
<td>425</td>
<td>160</td>
<td>484</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>144</td>
<td>472</td>
<td>161</td>
<td>494</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>139</td>
<td>364</td>
<td>191</td>
<td>585</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>152</td>
<td>412</td>
<td>154</td>
<td>491</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>-</td>
<td>-</td>
<td>142</td>
<td>310</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Statistical Assessment of the Body Weight *

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Initial body weight in grams</th>
<th>Period of observation in month</th>
<th>Final body weight in grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>154.19 ± 11.00</td>
<td>one</td>
<td>469.95 ± 66.83 **</td>
</tr>
<tr>
<td>Control</td>
<td>157.55 ± 16.29</td>
<td>one</td>
<td>420.05 ± 48.65</td>
</tr>
</tbody>
</table>

* The values are mean ± standard deviations

** Significance (P<0.02)

The numbers in parenthesis indicate the numbers of chicks in experimental and control groups.
MATERIAL AND METHOD

One month-old chicks were used in these experiments. The feed was prepared as indicated above. The twenty control chicks were fed with 30 g. mash each day, while the experimental twenty-one chicks were fed with 29 g. mash and one gram of dehydrated beef powder. The amount of protein in 30 g. of the mash was between 5.0 to 6.3 g. and the feed of the experimental chicks contained 6.5 to 6.7 g. The experiment was started on 29.1.1970 and terminated on 28.2.1970.

RESULTS

Table 1 gives the initial as well as final weight of the individual chicks. Table 2 gives the statistical assessment of the results.

DISCUSSION

The results of the feeding experiments have shown that the growth of experimental chicks was significantly higher than that of the controls, the value being $P < 0.02$. The question arises to what factor or factors in the feed of the experimental chicks the growth
increase is due to. It has naturally to be ascribed to the small amount of dehydrated beef powder added as a supplement to the diet of the experimental chicks. In this context the results of a feeding experiment by Uwaegbute and Lewis (1966) becomes relevant. They found that "When the diets were prepared in such a way that the recommendations of the National Research Council (49—) (1966) were only just met, the growth rate of chicks within the period of 2 to 3 weeks was equivalent to 16 g. per day but when the recommended levels were all increased by 20 per cent, the total protein still remaining at 20 per cent of the diet, the rate of growth was 18.5 g. per day. In another instance the amino acid pattern was adjusted to that of Dean and Scott (1962) and the birds grew at a rate of 21 g. per day; a diet based solely upon the maize—sesuaum meal mixture with 0.8 per cent added L-lysine supported a growth equivalent to 22.5 g. per day. In all the diets used in the bioassay procedure developed, this final pattern of amino acid balance was maintained."

Assuming that the nonprotein ingredients in the one gram of dehydrated beef powder added could not have materially influenced the growth in the experimental chicks, their increased growth can be attributed to the protein
fraction of the beef supplement. Three inferences as to the exact role of this protein fraction are possible; the augmented growth may be due to the additional quantum of amino acids supplied or to the growth-promoting amino acid balance resulting from the addition of dehydrated beef or the combined action of the two factors.

**SUMMARY**

1. The substitution of one gram of mash by one gram of dehydrated beef powder in a daily ration of 30 g. of mash per chick, resulted in increased growth in one month-old chicks.

2. It is inferred that the augmented growth may be due to the added amino acids quantum or to the resultant growth-promoting amino acid balance or to the combined favourable influence of the two factors.
REFERENCES


Fonda, P.M., Acebo, C. Badelles and Juan, S. Padalia. 1934. Protein supplements in poultry rations. I. Comparative studies of the effects of Shrimp meal, meat Scraps, tankage and fish meal as supplements in rations for growing chickens. Philippine Agri. 22, 582-598.


Hoffmann (F) - Ia. Roche & Co. Ltd., Basle, Switzerland.
The "Carophyll" products. Stabilized carotenoids for pigmentation in poultry.


Indian Standard specification for poultry feeds. 1968.


Taeufel, K. and Serzisko, R. 1962. Tocopherol Content of some fats and oils II. Distribution of Tocopherols in selected products. Nahrung, 6, 413-422.


Cited by

Travis, D.P. 1965. The deposition of skeletal structures in Crustacea 5. The histomorphological and histochemical changes associated with the development and calcification of the branchial exoskeleton in the crayfish Orconectes virilis Acta histochem., 20, 193-222.

