

translation of extracts from article by Cesare Conci (Zoological
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BREEDING UNDER EXPERIMENTAL CONDITIONS OF MALLOPHAGA.

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Goniodes gigas

p. 134 Breeding of the *Stenocrotaphus gigas* (Taschenberg), begun
in November 1949, lasted, with lengthy intervals, until
March 1955.

I summarise, in connection with my work of 1952, various
particulars concerning the technique employed.

A three-chambered electric thermostat was used. The specimens,
taken from the wing of a living or recently-killed fowl, were placed,
separately or in pairs, in a numbered glass test-tube, with a feather
from the fowl as food. As soon as a female deposited an egg she was
placed on a new feather and the feather with the egg was transferred
to another test-tube which was given a second number. For example,
if the initial pair occupied tube 8, the first egg was allocated
tube 8.1, the second tube 8.2 and so on. The tubes were examined each
day and the various observations on each specimen were recorded on cards.

Temperature centred around 38 degrees C; for humidity control,
the KNO₃ saturated solution method was used - or the simpler method
of beakers filled with water.

I now give brief data summarised from among the breedings
which shewed best results.

1). Temperature 38 degrees C. Humidity maintained through
a vessel filled with water. Duration 15 days (5 - 20 Sept. 1949).

2 adult couples in the thermostat. Of the first couple, the male
died after 4 days, the female after 15; 14 eggs were laid, only one of
which was closed, but the neanid died at the first stage. With the second
couple, the male died after 3 days and the female after 11; 7 eggs were
laid, none of which was closed.

2). Temperature 38 deg. C. Humidity 93% (saturated solution
of KNO₃). Duration 23 days (19 Sept. - 12 Oct. '49).

7 couples in the thermostat. The males lived for 2, 2, 5, 5, 5, 8, 14
days, the females 2, 4, 7, 7, 9, 12, 22. A total of 29 eggs was laid, 19
being closed; 3 neanids passed to the 2nd. stage but died between
4, 6, 7 days.

3). Temperature 38-40 deg. C. Humidity in this and all following
cases maintained with a water-filled vessel, i.e. at more than 90%.
Duration 16 days (8 - 24 November '52).

The thermostat contained one female, which lived 10 days,
depositing 3 eggs. After 8 days, ~~appeared to be closing~~ two eggs appeared
to be closing but the neanids died at this stage.

4). Conditions as in the preceding. Duration 29 days.
2 couples in the thermostat. The male and female in the first couple
lived 12 days. 3 eggs were ~~laid~~ laid, 2 being closed after 6 days; the
neanids lived for 1 & 2 days. Of the second couple, the male lived 8 days
and the female 24. 10 eggs laid, 9 being closed after 6, 6, 6, 7, 7, 7, 7, 8
days. After 7 days, one single neanid reached the 2nd. stage but died
2 days afterwards.

5). Conditions as in the preceding. Duration 24 days.
One couple in the thermostat. The male lived 9 days and the female 16.
2 eggs deposited, one of which after 9 days gave a neanid reaching the
2nd. stage after 8 days.

6). Conditions as in the preceding. Duration 24 days. One couple in the thermostat, living about 12 days. 5 eggs deposited, one only closed - after 10 days. The neanid passed to the 2nd. stage after 8 days.

7). Conditions as in the preceding. Duration 22 days. 6 couples in thermostat. A total of 24 eggs laid, of which only 4 closed.

8). Temperature 35 deg. Duration 12 days. 5 couples in thermostat. Only 4 eggs in all were laid, none of which closed.

9). Temperature 39 deg. Duration 12 days. 7 couples in thermostat. No egg was laid.

10). Temperature 39 deg. Duration 15 days. 4 females and 3 males in thermostat. In all 3 eggs laid, of which only one closed.

11). Temperature 39 deg. Duration 18 days. 3 couples in thermostat. 7 eggs laid, of which only one closed.

III - BIOLOGICAL DATA DERIVED FROM BREEDINGS.

..... It was, however, possible to establish the following tables together with sufficient data for a complete comparative morphological study.....

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I - Number of Eggs Laid.

Number of Eggs	Number of Females	Number Bred
1	8	7, 8, 10, 11, 12
2	4	5, 7, 9, 10
3	3	3, 4, 7
5	4	6, 7, 11
7	1	1
8	1	7
10	1	4
14	1	1

II - Duration of embryonic development (only for eggs which closed).

Number of days	Number of Eggs	Number Bred
6	6	4, 7
7	11	4, 7, 10, 11
8	5	3, 4, 6, 7
9	1	5

On average, therefore, embryonic development lasted 7 days.

III - Egg-closing as a percentage

Out of a total 108 eggs laid, 43 closed, i.e. about 40 %.

IV - Duration of 1st Stage (only for neanids which passed to 2nd. stage)

Number of days	Number of Neanids	Breeding Number
8	3	4, 5, 6

The first stage therefore lasted 8 days.

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V - Life Span of 1st-stage neanids not reaching the 2nd stage.

The following survivals were noted : days - 1, 1, 1, 2,2,2,, 3, 4,4,4,4,
7, 8, 9.

VI - Life Span of 2nd-stage neanids.

The following survivals were noted : days - 1, 2, 4, 4, 6, 7.

VII - Life Span of 3rd-stage neanids.

No observation.

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VIII - Life Span of Male Adults

The following survivals were noted for males of unknown age :
days : - 2,2, 3,3,3,3, 4,4, 5,5,5,5, 6,6,6, 7,7, 8,8, 9,9,9,
10,10,10,10, 11, 12,12,12, 14,14, 16, 19..

It is, naturally, necessary to take the larger numbers into consideration. I believe it can be stated that, generally, the males live about 20 days.

IX - Life Span of Female Adults

The following survivals were noted for females of unknownage :
days : - 2, 3,3,3,, 4, 6,6,6, 7,7,7, 9,9, 10,10,10,10,10,
11, 12,12,12,12,12,12,12,12, 13, 14, 15,15,15, 16,16, 18, 20, 22, 24.

The female life-span seems to be a little longer than the male; I think it can be taken that the females live about 1 month.

p. 138. E g g s (figs. 1-4)

The total length (ignoring the colon prolongation) varies between 1.22 and 1.35 mm and the greatest width between 0.63 and 0.70 mm. The shell thickness varies between 20 and 30 microns; it is more delicate in the fore portion.

p. 140. 1st-stage neanids (figs. 5-6)

Total length varies between 1.44 and 1.50 mm. The head is 0.48 - 0.50 mm. in length and 0.53 - 0.55 in width; it is therefore rather wider than long and presents an almost octagonal shape. Cephalic index (width : length) between 1.06 and 1.14. The abdomen is 0.62 - 0.68 mm. in length (measuring the length from the hind margin of the metathorax) and 0.72 - 0.77 in width; this also is, therefore, distinctly wider than long and has a very regular oval shape.

P. 141 2nd-stage neanids (figs. 7 & 9)

Total length varies between 1.94 and 2.22 mm. The head is 0.60 to 0.65 mm. in length and 0.70 to 0.77 in width. Cephalic index (width : length) between 1.12 and 1.20. The abdomen is 0.95 to 1.13 mm. in length and 1.08 to 1.43 mm. in width.

p. 143 3rd-stage neanids (figs. 8 & 10)

Total length varies between 2.75 and 2.89 mm. The head is 0.81 to 0.84 mm. in length and 0.91 to 1.00 in width. Cephalic index (width : length) between 1.12 and 1.23. The abdomen is 1.32 to 1.43 mm in length and 1.63 to 1.74 mm. in width.

Total length varies between ~~2.85~~ 2.85 and 3.25 mm - that is, it is sometimes less than total length of 3rd-stage neanids. The head is 0.93 to 0.98 mm. long and 1.05 to 1.10 wide. Cephalic index (width : length) between 1.09 and 1.16. The abdomen is 1.22 to 1.56 mm long and 1.71 to 1.85 mm wide.

Females (figs. 13 & 14.)

Total length varies between 3.3 and 3.70 mm. The head is 1.05 to 1.10 mm. long and 1.14 to 1.28 mm. wide. Cephalic index (width : length) between 1.08 and 1.17. The abdomen is 1.66 to 2.00 mm. long and 1.77 to 1.99 mm. wide.

Comparative Table of Total Length at the Various Stages

Egg	total length	1.22 to 1.35 mm.	
I neanid	"	1.44	1.50
II neanid	"	1.94	2.22
III neanid	"	2.75	2.89
Male Adult	"	2.85	3.25
Female Adult	"	3.38	3.70