

## The Transmission of *Aegyptianella pullorum*, Carpano, to Fowls by means of Ticks belonging to the Genus *Argas*.

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EXPERIMENTS were undertaken in order to ascertain whether *Argas persicus* (Oken), *A. moubata* Murray and *A. perengueyi* (Bedford and Hewitt) were transmitting agents of *Aegyptianella pullorum* to fowls.

### TECHNIQUE.

The ticks used for the tests were kept in the laboratory at room temperature, the maximum temperature during the day varying between about 24 and 29°C, and the minimum temperature at night varying between about 20 and 23.3°C. They were fed by liberating them along with chickens in an open glass box measuring 25.5 × 38 cm. and 35.5 cm. high. In the bottom of the box was placed a sheet of brown paper and on top of this a wooden grid. The ticks were placed on the paper, and the grid prevented the chickens from getting at the ticks and eating them. The ticks and chickens were placed in the box in the evenings, and taken out again on the following mornings. Only in the case of the adults of *A. perengueyi*, which refused to feed on the healthy chickens, was it found necessary to tie each bird down on a table and keep the tick on its skin during the night by placing a small square piece of bandage over the tick and sticking the edges of the bandage to the skin with collodion. The bandage was removed the following morning by damping and rubbing the edges with cotton wool soaked in ether.

Birds infected with the larvae of *A. persicus* were kept in small cages, and a tray containing water, into which the ticks fell after feeding on their hosts, was placed beneath each.

The first batches of larvae that were used were placed on chickens that were only a few days old, and as they could never be found on the birds afterwards, it would appear that very young chickens are more sensitive to the bites of the ticks than older birds, and being less covered with feathers, are more easily able to find the ticks and eat them. When older chickens were used the larvae were found on them without difficulty.

Two strains of *A. pullorum* were used, one being obtained from a poultry keeper at Pretoria North, who had sustained severe losses amongst his young chickens, and the other from Pietersburg.

To ensure that all the healthy birds used for these experiments had never been infected with *A. pullorum*, only young chickens kept, after hatching, in tick-free places were used.

EXPERIMENTS WITH *Argas persicus* (OKEN).

*Experiment 1.*

1.ix.32.—1 adult *A. persicus* fed on infected chicken (A). Pretoria North strain.

6.x.32.—Fed on healthy chicken (No. 1). Feeding interval 35 days.

10.ii.33.—Fed on healthy chicken (No. 7), five months after feeding on infected chicken.

*Results.*—Chicken No. 1 showed parasites, very rare, in the blood on 19.x.32. On the 21st parasites were frequent and there were marked anaemic changes. Died as a result of *A. pullorum* and secondary bacteraemia on the 22nd. Incubation period 13 days.

Chicken No. 7 showed parasites in the blood on 25.ii.33, and also on subsequent occasions, proving that an infected tick can infect more than one chicken. Incubation period 15 days.

*Experiment 2.*

1.ix.32.—2 adults *A. persicus* fed on infected chicken (A). Pretoria North strain.

15.x.32.—Fed on 2 healthy chickens (Nos. 2-3). Interval between feeding 44 days.

27.i.33.—Adult No. 1 fed on healthy chicken (No. 8).

Adult No. 2 refused three times to feed on healthy chicken (No. 9).

*Results.*—Chicken No. 2 died through accident on 20.x.32. No parasites found in the blood.

Chicken No. 3 showed parasites in the blood on 27.x.32, and also on subsequent occasions. Incubation period 12 days.

Chicken No. 8 showed parasites in the blood on 9.ii.33, and also on subsequent occasions. Incubation period 13 days.

*Experiment No. 3.*

3.ix.32.—4 *A. persicus* (3 adults, 1 nymph) fed on infected chicken (B). Pretoria North strain.

18.x.32.—Fed on 2 healthy chickens (Nos. 4-5). Interval between feeding 45 days.

*Results.*—Chickens Nos. 4 and 5 showed parasites, very rare, in the blood on 31.x.32. Incubation periods 13 days.

*Experiment No. 4.*

21.x.32.—2 adults *A. persicus* fed on infected chicken (C). Pretoria North strain.

1.ii.33.—1 adult fed on healthy chicken (No. 11). Interval between feeding 102 days.

*Results.*—The result was positive, parasites being found infrequent on 3.iii.33. It is not known, however, when the parasites first appeared in the blood of the chicken.

*Experiment No. 5.*

7.xii.32.—1 adult *A. persicus* fed on infected fowl (E). Pietersburg strain.

3.ii.33.—Fed on healthy chicken (No. 13). Interval between feeding 26 days.

*Result.*—Chicken showed parasites in the blood on 15.ii.33, and also on subsequent dates. Incubation period, 12 days.

*Experiment No. 6.*

7.xii.32.—1 adult *A. persicus* fed on infected fowl (E). Pietersburg strain.  
25.ii.33.—Fed on healthy chicken (No. 14). Interval between feeding 79 days.

*Result.*—Chicken showed parasites in the blood on 11.iii.33. Incubation period 14 days.

EXPERIMENTS WITH *Argas moubata*, MURRAY.

*Experiment No. 7.*

30-31.x.32.—1 nymph (♂) *A. moubata* fed on infected chicken (D). Pretoria North strain. Parasites were rare in the blood on the 31st, only one being found per field.

25.xi.32.—Fed as adult on healthy chicken (No. 6). Interval between feeding 24-25 days.

*Result.*—Chicken showed no signs of infection.

*Experiment No. 8.*

30-31.x.32.—1 female *A. moubata* fed on infected chicken (D). Pretoria North strain.

2.ii.33.—Tick gorged on healthy chicken (No. 12). Interval between feeding 93-94 days.

*Result.*—Chicken showed no signs of infection.

*Experiment No. 9.*

30-31.x.32.—1 male *A. moubata* fed on infected chicken (D). Pretoria North strain.

24.ii.33.—Fed on healthy chicken (No. 16). Interval between feeding 115-116 days.

*Result.*—Chicken showed no signs of infection.

*Experiment No. 10.*

30-31.x.32.—1 male *A. moubata* fed on infected chicken (D). Pretoria North strain.

28.ii.33.—Fed on healthy chicken (No. 17). Interval between feeding 119-120 days.

*Result.*—Chicken showed no signs of infection.

*Experiment No. 11.*

8.ii.33.—10 nymphs, whose mother fed on infected chicken (D) on the 30-31.x.32, fed on healthy chicken (No. 15).

*Result.*—Chicken showed no signs of infection.

EXPERIMENTS WITH *Argas perengueyi* (BEDFORD & HEWITT).

*Experiment No. 12.*

1.xi.32.—1 female *A. perengueyi* fed on infected chicken (D). Pretoria North strain. Parasites frequent in blood.

3.iii.33.—Tick gorged on healthy chicken (No. 10). Interval between feeding 4 months.

*Result.*—Chicken showed no signs of infection.

*Experiment No. 13.*

1.xi.32.—1 male *A. perengueyi* fed on infected chicken (D). Pretoria North strain. Parasites frequent in blood.

4.iii.33.—Tick gorged on healthy chicken (No. 18). Interval between feeding 4 months.

*Result.*—Chicken showed no signs of infection.

*Experiment No. 14.*

30-31.x.32.—1 male *A. perengueyi* fed on infected chicken (D).

7.iii.33.—Placed on healthy chicken (No. 19).

The tick could not be found the following morning, and it is therefore not known whether it fed or not.

*Result.*—Chicken showed no signs of infection.

SUMMARY AND CONCLUSIONS.

*A. persicus* is a transmitting agent of *Aegyptianella pullorum* to fowls. The disease was successfully transmitted to 9 healthy chickens by adult ticks which had previously fed on infected chickens. Moreover, the tick can retain its infection after feeding on a healthy bird, as one adult transmitted the disease twice to healthy chickens. The shortest interval between feeding on an infected bird and a healthy chicken was 26 days. The incubation period in chickens after an infected tick has bitten varies from 12 to 15 days or more. An infected adult *A. persicus* may remain infected for at least 162 days. *A. pullorum* is apparently not transmitted by either *Argas moubata* or *A. perengueyi*, as four adults of *A. moubata* and two or three adults of *A. perengueyi* failed to transmit the disease to healthy chickens after having fed on infected birds. Nymphs of *A. moubata*, whose mother had fed on an infected chicken likewise failed to transmit the disease to a healthy chicken.

It is noteworthy that *Spirochaeta anserina* was never seen in any fowl in these experiments.