

OBSERVATION OF PIGEON HERPESVIRUS 1 RE-EXCRETION DURING THE REPRODUCTION PERIOD IN CONVENTIONALLY REARED HOMING PIGEONS

By

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INTRODUCTION

Pigeon herpesvirus 1 infection (*Columbid herpesvirus 1*, PHV1) is a worldwide infection of pigeons. In Belgium, up to 80 per cent of the animals are infected as shown by serological surveys (Vindevogel, 1981).

This agent is important in the aetiology of respiratory tract illness of the pigeon (Vindevogel and Duchatel, 1978; Vindevogel, 1981). Classical signs of the associated disease are conjunctivitis, rhinitis and focal necrosis in mouth, pharynx and larynx (Cornwell and Wright, 1970; Vindevogel, Pastoret, Burtonboy, Gouffaux and Duchatel, 1975; Vindevogel, 1981; Vindevogel and Pastoret, 1981).

After recovery from a primary infection, pigeons become latent carriers and episodes of recurrence may occur spontaneously or after cyclophosphamide (Cy) treatment (Vindevogel, Pastoret and Burtonboy, 1980; Vindevogel, 1981; Vindevogel and Pastoret, 1981).

The virus is horizontally transmitted through direct contact between birds and egg transmission seems unlikely (Vindevogel and Pastoret, 1980, 1981).

In a flock of pigeons naturally infected with PHV1, some mature birds are asymptomatic carriers of the infectious agent and transmit it to their offspring. The squabs become infected but are protected from the disease by the passive immunity of maternal origin and most of them become themselves asymptomatic carriers after this initial infection. Clinical disease is principally observed in the primary infection of young pigeons derived from parents free of the infection or in carriers of the virus with the help of debilitating factors (Vindevogel and Pastoret, 1980).

In order to understand why most of the squabs are infected quickly after hatching, we have followed, under natural conditions, the episodes of viral re-excretion of 10 pairs of latently PHV1 infected homing pigeons during the reproduction period.

MATERIALS AND METHODS

Animals

Ten pairs of clinically healthy pigeons, latently infected with PHV1 were used. They were 2- to 3-year-old conventional homing pigeons chosen for breeding according to their flying performances; indeed, they had participated in races as young homing pigeons (during the first year of life) and as yearlings (second year of life). During each racing season, all of them had presented signs of coryza and PHV1 was isolated from the pharynx of each bird during that period. Pigeons had therefore been naturally infected during their first year of life.

Before the experiment and until mating, the females were enclosed in a separate dove-cot, called "female dove-cot" and the males in the "male dove-cot" (resting period before mating).

Between the fifth and the sixth week of the experiment, pigeons were mated: all male and female pigeons were placed together in the same enclosure ("breeding dove-cot") and each male chose a female to form a pair. Squabs hatched at the beginning of the eighth week of the experiment and were weaned during the 11th week. The experiment was carried out between November and March. Pigeons had no contact with exogenous birds during the whole observation period.

Sampling and Virus Isolation

The pharyngeal mucous membrane of each pigeon was swabbed weekly during the 13 weeks of the experiment. PHV1 infectious particles in swabs were titrated and characterized according to previously described methods (Vinde vogel *et al.*, 1980).

RESULTS

Viral excretion patterns, as plaque-forming units (PFU) for each of 10 male and 10 female pigeons are given in Figs 1-5.

Throughout the experimental period, the pigeons remained healthy.

Half of the animals began to re-excrete PHV1 from the third week of the experiment and the others during the following weeks, but all of them before the mating period, either in the male dove-cot or the female one.

For most of the birds, PHV1 re-excretion persisted until the squabs were weaned. Some pigeons ceased to re-excrete during brooding but they re-excreted again during squab-gorging. After weaning of the squabs, all parents ceased to excrete virus.

DISCUSSION

The observations were made under natural conditions in homing pigeons reared in a dove-cot latently PHV1-infected.

All the pigeons excreted the virus before mating, that is to say when the males and females were enclosed in 2 separate enclosures. Since the birds had not yet paired before the beginning of PHV1 excretion, there was no opportunity of cross-contamination between males and females and therefore no possible correlation between excretion of virus by individual members of a pair, even if sexual behaviour began before artificial mating.

Moreover, no exogenous transmission of PHV1 could occur since the

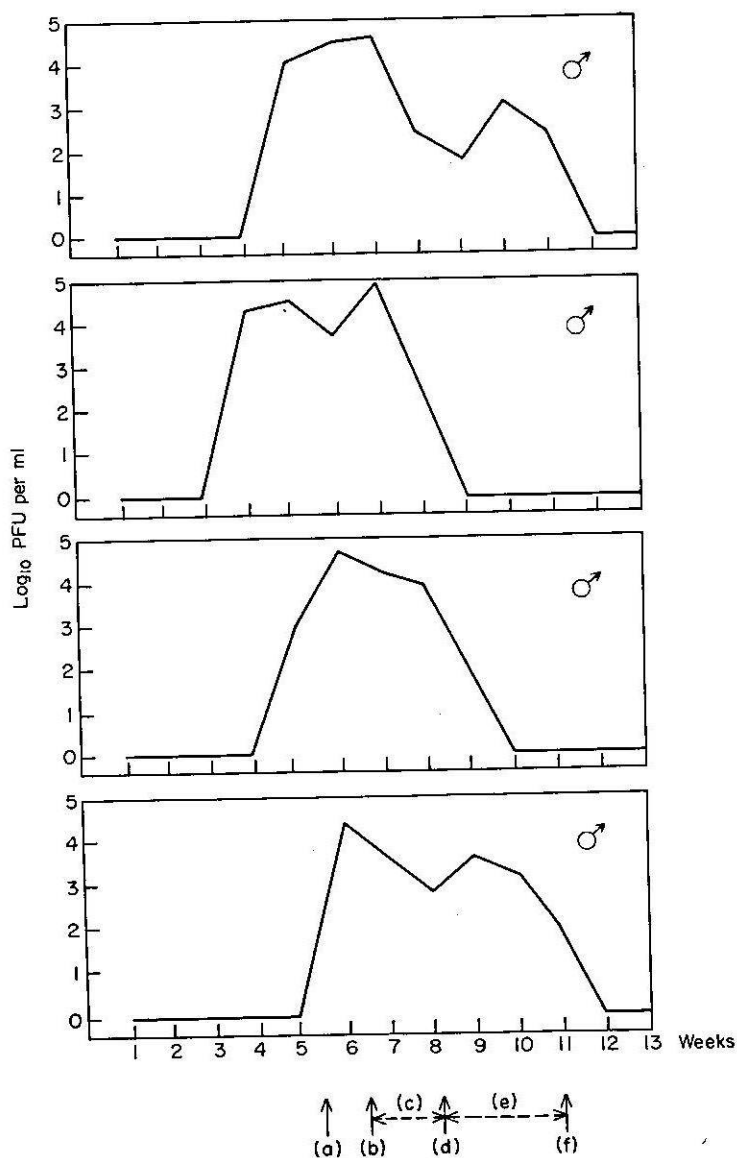


Fig. 1. Re-excretion of PHV1 (log₁₀ PFU per ml) during the reproduction period in 10 male and 10 female pigeons. (a) mating; (b) laying; (c) brooding time; (d) hatching; (e) squab-gorging time; (f) weaning.

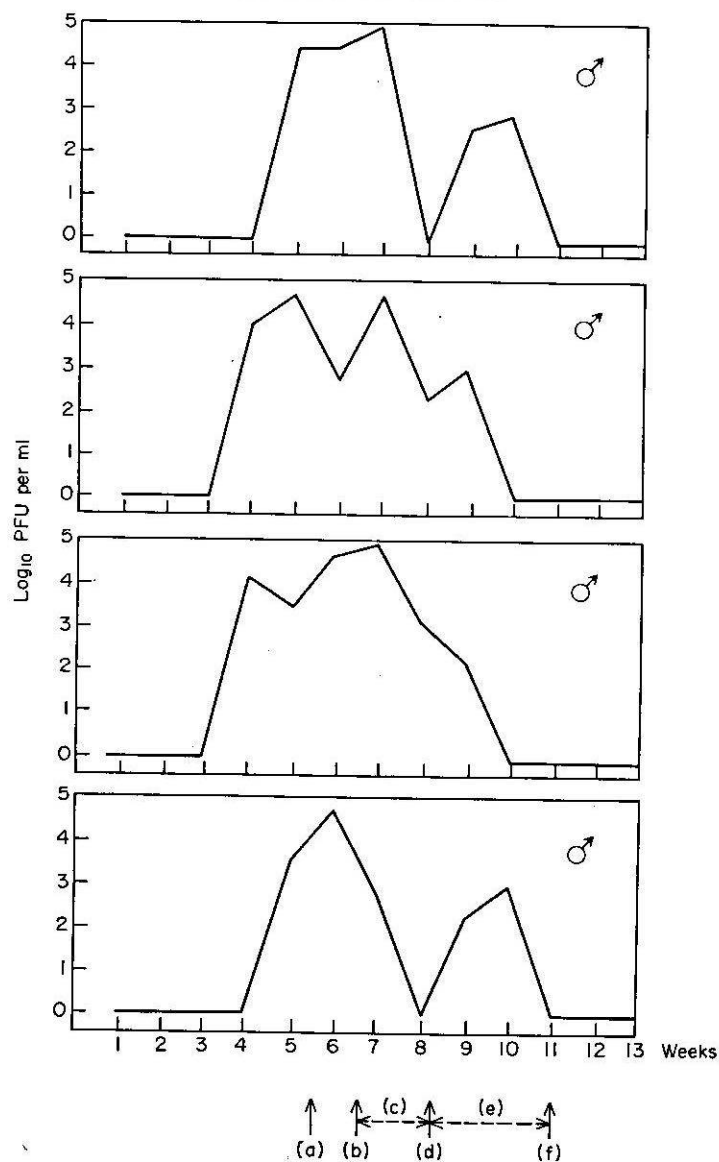


Fig. 2. Re-excretion of PHV1 (log₁₀ PFU per ml) during the reproduction period in 10 male and 10 female pigeons. (a) mating; (b) laying; (c) brooding time; (d) hatching; (e) squab-gorging time; (f) weaning.

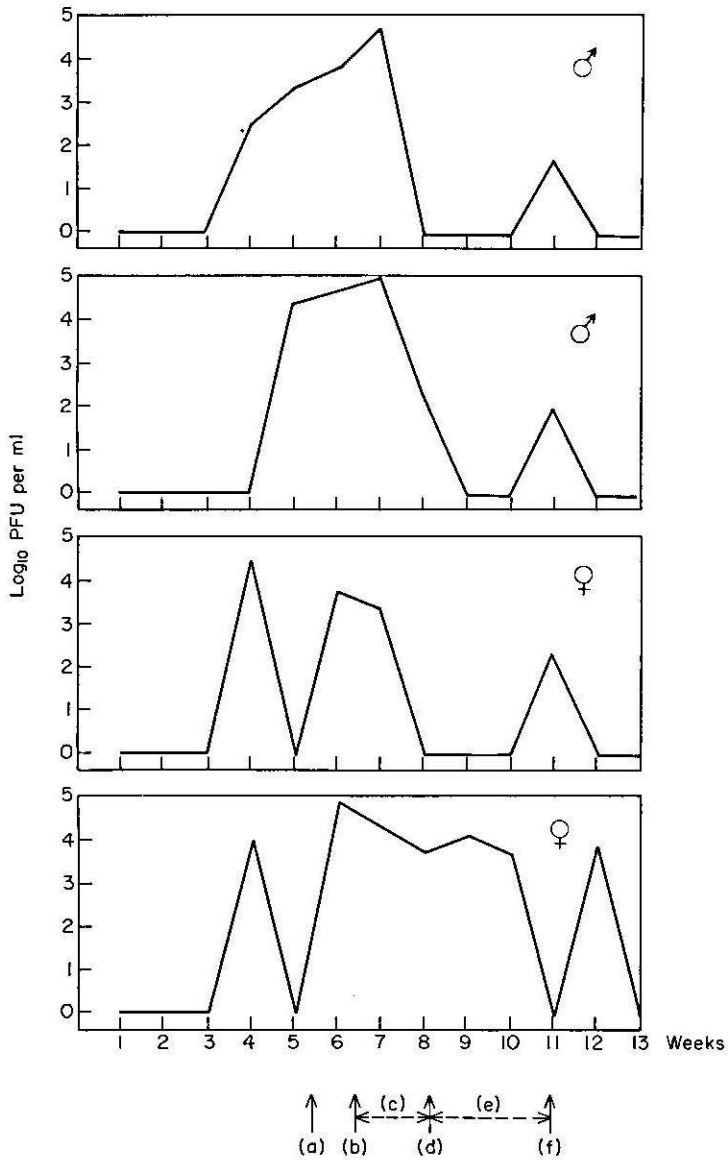


Fig. 3. Re-excretion of PHV1 (log₁₀ PFU per ml) during the reproduction period in 10 male and 10 female pigeons. (a) mating; (b) laying; (c) brooding time; (d) hatching; (e) squab-gorging time; (f) weaning.

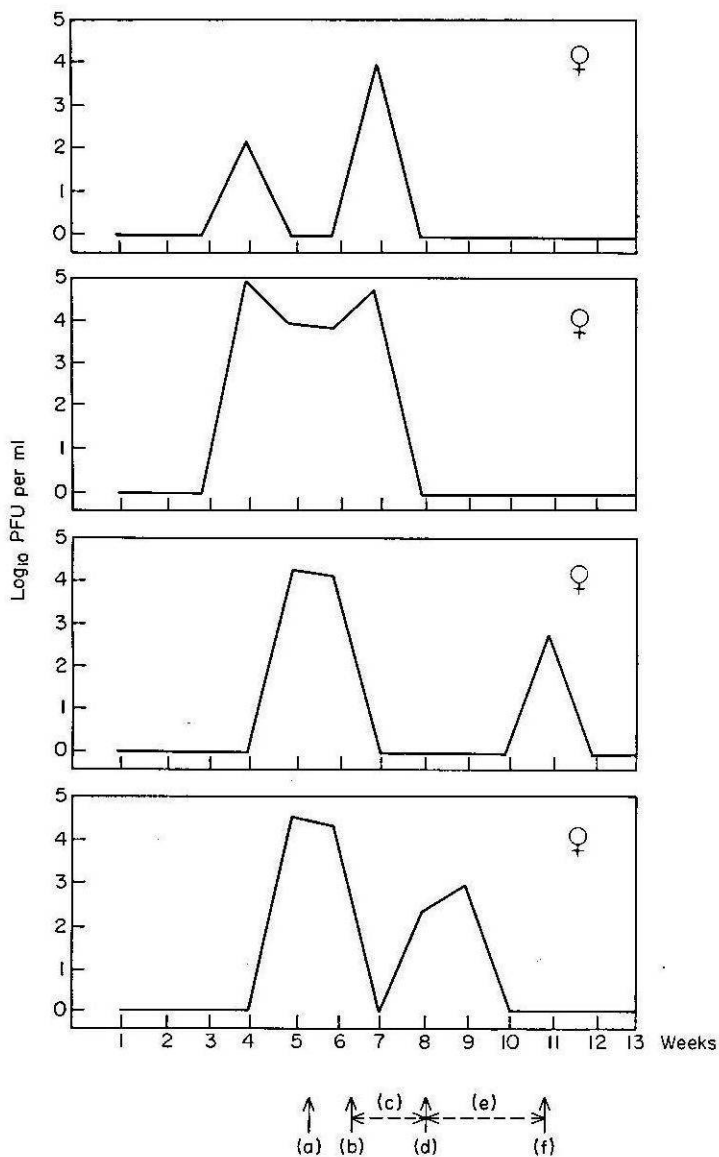


Fig. 4. Re-excretion of PHV1 (\log_{10} PFU per ml) during the reproduction period in 10 male and 10 female pigeons. (a) mating; (b) laying; (c) brooding time; (d) hatching; (e) squab-gorging time; (f) weaning.

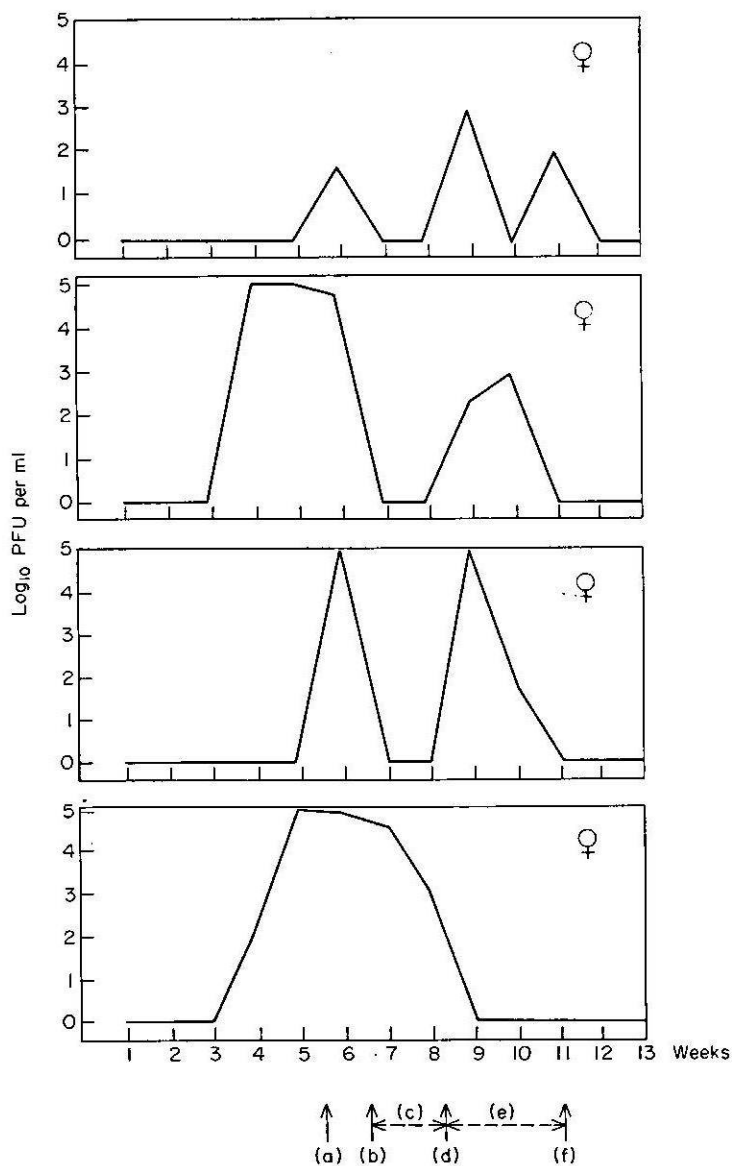


Fig. 5. Re-excretion of PHV1 (log₁₀ PFU per ml) during the reproduction period in 10 male and 10 female pigeons. (a) mating; (b) laying; (c) brooding time; (d) hatching; (e) squab-gorging time; (f) weaning.

pigeons were enclosed without flying during the whole observation period and since no contamination could be demonstrated before the end of the resting period.

All the latently infected mature pigeons re-excreted PHV1 during the reproduction period. Most of them re-excreted virus during the squab-gorging period and were therefore able to transmit the infection to the squabs soon after hatching, which is when the squabs are protected by the passive immunity of maternal origin. There is therefore a sophisticated equilibrium between the virus and the host which allows a fully virulent virus to be transmitted during a period of passive protection, so avoiding the harmful effect of the infection and allowing the survival both of the host and the virus which becomes latent (Vindevogel, Pastoret and Thiry, 1984).

The mechanism whereby the parents re-excrete virus during the reproduction period remains to be studied.

SUMMARY

Pigeon herpesvirus 1 (PHV1) re-excretion by latently infected mature homing pigeons was followed during the reproduction period under natural conditions.

All latently infected pigeons re-excreted PHV1 during the reproduction period and most of them during squab-gorging.

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