PIGEON POX — A CONTINUING PROBLEM

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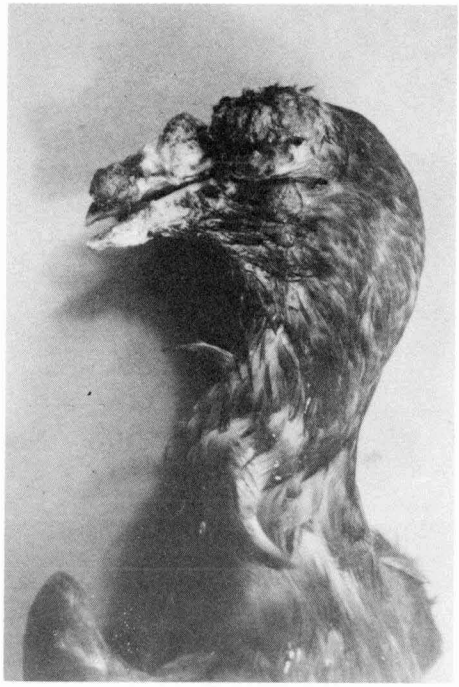

Advanced stage of Pigeon Pox.

Pigeon pox is a common virus disease of unvaccinated susceptible pigeons (Fig. 1). The epitheliotropic DNA virus has a predelection for skin and mucous membranes with the formation of visible wart-like, "pock" lesions on the surface epithelium. Gross internal pox lesions do not appear in pigeons even though the virus produces a systemic reaction and occasionally results in a viremia with virus circulating in the blood stream.

The agent is classified in the genus, avipoxvirus, which includes: fowl, turkey, pigeon and canary viruses. Sparrow, duck and guinea pox may also be separate viruses within this group. They are all similar and appear to be related. This avipox grouping is one of five genera. Other pox viruses affect animals, man and fish, and are classified on the basis of related characteristics.

Pigeon pox is related to other pox viruses by its ability to multiply solely in the cytoplasm of the cells it invades. It has a deoxyribonucleic acid core which largely occurs as double stranded molecules covered with double membranes, the outer membrane being composed of a lipoprotein. The brick-shaped virus particle is among the largest in size ranging from 200 to 300 nanometers in length. This is very small when compared to bacterial cells which range in size between 0.2 micron and 200 microns. For comparison, a nanometer is one billionth of a meter and a micron is one millionth part of a meter.

As a general rule, pox virus particles invade rapidly growing new epithelial cells. Here they replicate, producing introcytoplasmic inclusions called Bollinger bodies. These may be identified under a light microscope as distinctive eosinophilic particles in stained tissue sections.

The avian pox viruses are antigenically closely related to one another but are immunologically distinct from other animal pox viruses. From work that we have conducted, it is obvious that even within the so-called pigeon pox vaccine strains, there are distinct antigenic differences. Members of the overall pox group of viruses are reported to contain a nucleo-protein precipitating antigen which is common to all, but this may not be specific for only pox viruses. Hemagglutinins are also produced by the avian pox viruses which means that red blood cells can be agglutinated by them.

Serologically it is interesting that pigeon pox may or may not affect other species of birds and may or may not engender a high degree of tissue immunity. In chickens, pigeon pox produces visible epithelial infection with resulting immunity proportional to the number of feather follicles innoculated. In one study by Irons, crows, hawks, owls, ducks, guinea fowl and starlings were not found to be susceptible to pigeon pox, but the virus was shown to be infectious for English sparrows and related species.

Kossack studied a natural pigeon pox outbreak in mourning doves in which the virus was transmitted to ring doves. Burnett reported that in turkeys, pigeon pox virus may produce a severe reaction without producing immunity to turkey or fowl pox viruses. Also, according to Brandly and Dunlop, canary virus immunizes against pigeon virus to a high degree, and pigeon virus protects against itself and canary virus but does not give complete protection against turkey and fowl viruses. It has also been reported by Jansen that vaccination with pigeon pox does not protect against a jackdaw strain of canary pox virus. Jactot, in a separate report, indicated that pigeon pox immune fowl were immune to a strain of canary pox virus that he isolated. From these various research observations, one can appreciate the intricate antigenic relationships that exist, probably as a result of the lipoproteins that form the outer membranes of the virus. The common nucleoprotein antigen, in the core of the virus, probably has little to do with the specificity of each agent.

Transmission of the disease is largely the result of wound infection created by mosquitoes and other biting and sucking insects such as mites or pigeon louse flies. These parasites serve purely as mechanical carriers of the virus, which appears to localize on or in the proboscis of mosquitoes. When the mosquito bites the unfeathered portion of the skin, the virus is merely wiped off or pushed out, and thus, it gains entrance into damaged cells. Pox virus is in itself unable to penetrate the intact epithelium to produce infection.

The diptheritic form of the disease, which is more serious, produces firmly-attached, cheesy yellow masses on and in the mucous membranes of the mouth, tongue or entrance to the trachea. It also sometimes attacks the eye or nasal cavity. This form may be spread by dust under

very dry conditions when birds are in close confinement or by water as a result of water pan contamination with a scab or secretion from an exposed lesion. It is generally considered that grit is essential for water pan transmission. The sharp grit produces a scratch or cut as it is ingested, thus enabling infection when contaminated water is consumed.

Transmission by mosquitoes requires the development of an infected mosquito population. In the northern states, most mosquito transmitted pox thus develops late in the summer or fall, but other methods of transmission tend to establish the disease at other times of the year. In the south, pox may be prevalent at all times of the year because of the lack of winter kill.

To prevent the disease, pigeon fanciers now have the Vineland Poultry Laboratory vaccine, which according to our tests, is the only pox vaccine strain effective for the control of the disease in pigeons. In the application of the vaccine, only four or five mature feathers should be removed from the breast or leg. The vaccine should then be brushed upward into the feather follicles, using the brush supplied with the vaccine. Only healthy birds four to six weeks of age should be vaccinated. A successful vaccination is indicated by swollen follicles with the possible formation of a scab at the site in two to three weeks. This "take" or swelling appears at about the fifty day and is largely gone in three weeks. Examination for "takes" should be conducted about 7 to 12 days after vaccination. At least 95% of the birds should show takes if the flock is vaccinated properly.

Pens or flocks showing any evidence of pox should not be vaccinated and birds with lesions should be isolated until they are well over the infection. Screening of pens housing such birds to exclude mosquitoes will aid in preventing further transmission until the rest of the flock is vaccinated and immune. Since immunity is directly related to the disappearance of the "take" or swelling, one can safely expose vaccinated birds three weeks after a successful vaccination.

Obviously, vaccination should be undertaken well before shows or before the racing or breeding seasons begin so as not to interfere with their condition or stamina. Pox imposes fever and stress for a period of two or three weeks, which may affect the appetite and general appearance of the bird. Generalized pox and death of birds can occur if too many follicles are inoculated; but if directions are followed and if birds are repeatedly vaccinated each year, a fancier will seldom experience pigeon pox problems.