**Nestling disease in Budgerigars and its connection with the problem of "runners"**

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Nestling disease in Budgerigars is an acute infectious disease caused by a virus from the Papovavirus group.
The term "runner" is applied to a Budgerigar which, as a result of a disturbance of feather development, is incapable of flight. The following article discusses both disorders and possible connections between them:

**1. Nestling disease in Budgerigars.**

 a.) Pathogen:
The causative virus is a small virus without an envelope that is very resistant and infectious for long periods of time not only in the environment, but also in the bird room or aviary as well as on cages and equipment. It survives temperatures of 56°C for several hours and cannot be killed with common disinfectants. For disinfecting, substances containing iodine or a combination of several "aldehydes" as their active agents are recommended. However, when using substances containing iodine it is important not to treat anything containing calcium since they are inactivated. These substances must be left to work for at least two hours in order to be effective. Such exposure time is not possible on the walls of the bird room or on non concrete or aviary floors. Under these circumstances it is advisable to treat the floor with a blowtorch, taking the necessary precautions, and ensuring that this method is not used on plastic coated walls. The virus is extremely infectious.

 b.) How is the disease caused?
The virus may cause acute disease in nestlings whilst, although older birds and breeding pairs do not usually fall ill, they harbour and excrete the virus. The virus grows in epithelial cells (these are the cells that form the actual surface of the skin and mucous membranes as well as the kidney tubules). This means that the virus may be transmitted to the chicken with the contents of the breeding pairs crop when feeding, or may reach the droppings from the urine to infect the food and water.
The third, possibly most important, transmission route is via infected dust to the respiratory apparatus. The virus develops in the skin and the young feather shafts, and is released into the air with feather powder and small scales of skin. The nestlings can hardly avoid infection once the virus is present in the stock. However, the different virus strains differ in their ability to cause disease with the result that the number of deaths varies from a few isolated cases to over 90%. Nevertheless, the same disease process in the nestlings appears to occur in all cases. The virus multiplies at the site of entry (lung, beak cavity or crop) where it is released into the circulation to be transported all over the body where it infects susceptible cells. The extent of tissue damage to the inner organs, with or without the death of the animal depends on the severity of this generalized infection. The virus also almost completely inhibits those cells that produce the necessary substances for specific defence against the infection (antibodies) . If the nestlings survive the acute infection, the virus may multiply in the growing feathers which are consequently ruined, i.e. they fall out or are deformed. The incubation time (the time that elapses between infection and the onset of visible signs of illness) for nestlings is 10 - 21 days (calculated from the day the chicks hatch).

 c.) Clinical picture
Affected nestlings have a swollen abdomen, severe signs of dehydration (particularly visible in the legs and feet which appear to have shrivelled) and fouling of the cloacal region, more with whitish urine than with droppings. When compared with healthy nestlings they show retarded growth of the contour and primary feathers or deformation of the down feathers. This explains why surviving Budgerigars may become runners.

 d.) Post mortem findings
The autopsy f indings are not as consistent as the clinical picture since they are often influenced by secondary infections, e.g. by E. coli or flagellates (single- celled organisms with long whip like organelles of motility). The skin is coloured reddish or bluish; the crop is often still well filled this may be regarded as a sign of sudden death. After opening the bird's body the enlarged heart can be seen lying in the heart sac which is filled with fluid. The liver is swollen and shows pale, foci (localized areas of disease) which usually consist of dead tissue. As a rule the kidneys are coloured blackish red and are swollen.

 e.) Diagnosis
The diagnosis is confirmed by histopathological examination or by demonstrating the virus. Serological, i.e. blood tests are possible for identifying birds carrying the virus.

 f.) Host spectrum
The disease can be transmitted to other parrots and parakeets.
The following species have been proved susceptible to date:

 Various species of macaw.

 Sun-Conure (Aratinga solstitialis) Jandaya Conure (Aratinga jenday)

 Sub species of Conure (Aratinga auricapilla)

 Red-masked Conure (Aratinga erythrogenys)

 Peachfronted Conure.(Eupsittila aurea)

 White-eyed Conure (Psittacara leueophthalmus)

 Slender-billed Conure (Enicognatus leptorhynchos)

 Various species of amazon

 Various species of pionus parrot

 Grey-parrots (Psittacus erythacus)

 Various cockatoos (Cacatua species)

 Eclectus-Parrots (Eclectus roratus)

In these species too, only the nestlings fall ill. The incubation time is extended to 20 - 56 days in parallel with the longer time it takes the chicks to develop. The signs of disease may also differ from those in Budgerigars. Apart from acute diseases there are also chronic forms in which the nestlings just waste away, but they sometimes also recover. Excessive bleeding after plucking a small feather could be a sign of disease. Amazons may become paralysed shortly before death.

 g.) Control

 There is no specific treatment. Since the virus may be transferred from one nest box to the other by the hands, it is advisable not to try and help the young birds with restoratives etc.. No vaccine is available as yet. Interrupting breeding for several months (3 - 4) in Budgerigars and for approximately one year in the other susceptible species has proven most valuable hitherto. This reduces the number of highly sensitive birds and restricts multiplication of the virus. The affected breeding pairs can produce the antibodies that are passed on to the chicks via the eggs to protect them against clinical forms of the disease. During this time it is advisable to clean and disinfect the cages and environment several times. Exhibitions pose special dangers. Birds brought back or purchased from such events should be held in quarantine for approximately six weeks and kept with some of the breeder's youngest birds to serve as sentinel birds. In the case of Budgerigar nestling disease, at least one nest with chickens of the right age should be present.

**2. "Runner" problem**

Disturbances of feather development leading to the inability to fly are frequently encountered in Budgerigars, and have prompted animated controversy as to their cause. Damage to the plumage caused by the development of a virus in growing feathers or by a deficiency of one or more essential (dietary) factors for feathers usually lead to the same clinical picture. No direct comparisons are possible. Histopathological examinations of fully mature, deformed feathers is of no use since they no longer show any evidence of the virus and its typical signs. The sudden occurrence of numerous runners from different nests indicates an infectious cause such as the Papovavirus. As already mentioned, there need not necessarily be conspicuous losses among nestlings. In cases of feather damage caused by Papovavirus and dietary deficiency the plumage will appear normal after the next moult or, at the latest, the moult after that. This is not the case for "French moult" in Budgerigars, the cause of which is not yet understood; and for which the term runner was originally coined.

During a French moult the bird loses the primary feathers from the wings and tail and often bleeds profusely because these feathers are still not fully developed at this time. The remaining plumage looks very rough, and isolated contour feathers may be deformed. In this form of runner, immature feathers fall out after every successive moult and, as a rule, the bird is incapable of flying for the rest of its life.
This makes it necessary for the breeder to keep the runner for at least one moulting period to find out whether his bird has genuine French moult, or whether it suffered a Papovavirus infection or dietary deficiency during the crucial development period.
Such a distinction can be important for breeders when judging Budgerigars since the occurrence of isolated dietary deficiencies and French moult indicates that unfavourable genetic factors are involved in the cause of disturbances of feather development.