**Cause of French Moult**

by Martin Schneck

A virus from the Papovavirides family, which has also often been isolated in FRG (not only with Budgerigars) is generally considered to be the cause of FM 1.3. This literature may be able to help you to recognize the Papovavirus when it has already broken out and to fight it or prevent this extremely obstinate virus breaking out at all.

What is a virus and how can it be destroyed?

A virus is a millionth millimetre sickness causing "something", which finds certain body cells where they multiply at rapid speed. The illness needn't necessarily break out straight after the infection (incubation), but antibodies are produced at the time of the first attack. These help to destroy the virus. The lay-out for these anti-bodies can be re-called years later. It is obvious that a healthy body can settle the virus much quicker than a weaker body, where the virus can spread out much quicker. This is because the immunity system has to fight against other enemies (Bacteria, Parasites, Fungi, etc.) at the same time. The chance to win declines. American scientists have discovered that stress can weaken the immunity system 10 (see also 11). Medication against the virus is not yet known. A promising counter-measure could be immunization. What happens here? The body receives for example a weakened virus to motivate the production of anti-bodies. This way the "original" virus does not stand a chance. Going back to the Budgerigar - a lot of things which have been said can be transferred to the budgerigar but a serum against the papovavirus has not yet been discovered. (July 1988).

How does the virus get into your own stock?
The purchase of additional birds is a primary cause 2,3,5. These birds seem to be healthy. Many pathogenic agents are exchanged, contagion and the visible outbreak of illness. It is presumed that the virus is passed on not only through direct contact but also through feather dust getting into the respiratory system as into the crop entrance of the healthy birds. If we leave the birds enough time before putting them under pressure (e.g. breeding) antibodies should have been produced (natural immunization). The purchase of new animals should begin by June/ July !!! if breeding start is planned in November. However, should these come into the stock later we advise two breeding possibilities. 1. To breed in quarantine ( breeders advice: Pair the purchased birds immediately or you can lose a year breeding) or: 2. Leave them in quarantine till the last breeding round begins. If trouble starts now, then you should do without new birds! But also later you have to reckon with disease breaking out in the whole stock. e.g..
Through permanent brooding 3.4. Two broods per pair is enough!
By changes in living conditions and definite deviation in proper care. By crowded breeding rooms and flights. (Stress in every form).
By continual changing of food (non-germinable food or sudden withdrawal of the usual food).
\* By frequent changing around of stock into different cages. Up to now two different kinds of papovavirus have occurred.

* 1. A chronical form of Papovavirus = CPV (known as French Moult).
* 2. The acute form of Papovavirus = APV. Quite identical viruses or anti-bodies have been discovered in both sicknesses
* 3. The chronical.form of Papovavirus = CPV This occurs mainly with chicks at the age of 3 to 7 weeks firstly in one breeding cage then spreading out in waves. It comes in late winter up into spring, usually in cool, badly aired and damp rooms, more often than outside 5, 7. The young birds lose (a few or all) wing feathers and tail feathers within a few days. The wing feathers usually fall out symmetrically i.e. on both wings the same feathers - in rare cases the tail feathers fall out alone.

Under certain circumstances bald patches appear on the head, possibly on the stomach and on the back (partial nakedness) which grow again later. Three further development possibilities can follow;

* 1. The budgerigar loses weight and dies after a short time, at the latest after his first regular moult.
* 2. The lost feathers grow again so that after about 6 weeks the coat seems complete again (without shine). The value of these birds is very much discussed.Known breeders are said to have been successful in further breeding of these birds. By using these birds for breeding I fear that resistance is greatly reduced in following generations. (Further pairing of runners clearly produce more runners). A breeder friend e.g. always has many runners if he pairs two certain lines with each other.
* 3. The lost feathers do grow again but keep falling out. This bird will never mature - therefore is no good. FM feathers can be recognized (in many cases also later) by the following signs. The feathers have particularly narrow barbs and are usually thin and lustreless 2,3,5. They look mangy and untidy above all in the centre of the feather

1. Some outgrown feathers show irregular red brown to black lesions in the quill which remind us of marble 2,5.
Some feathers turn around and stick out at an angle to the otherwise flat lying feathers 2,3,5. This unnatural position is caused by narrowing in the area of the quill or root. Particularly long growing feathers can be observed which causes the wings to cross 2,3. The tail feathers are also extremely long.
Wing and tail feathers are loose and fall out easily at touch or stress situations.
Brittle and easily broken feathers.

The acute form Papovavirus = APV
This form of Papovavirus usually occurs after several breedings, primarily with a small part of the couples is limited to a few very young fledglings at first. The virus spreads out very quickly throughout the nests. The result is mortality up to 100% (each line) of the fledglings up to 15 days of age 2,3,4.

**Quote:**"The lack of mortality as sequela of this disease may depend upon the age of an animal at the time of infection. The fatal papovavirus infection under natural conditions has been observed in very young budgerigars less than 2 weeks of age 4,5,6. However, experimental exposure of young budgerigars at 4 weeks of age produced histologic lesions of variable severity but none of the inoculated birds died 4. These works suggested the possibility that many budgerigars after recovery from the clinical infection remained carriers capable of transferring the virus to the healthy bird 7".This APV can easily be recognized by observative breeders. One of the first signs can be the droppings of the fledgling. It becomes suspicious if these are permanently watery and soft. After the age of ten days the fledgling lacks the typical filoplumes on head and neck (Vulture head). The filoplumes often thin out so badly that only after filoplumes stick out like twisted trees. The older the birds get the clearer these signs are. In some cases the complete covering feathers can be missing or fall out (partial nakedness) 2,3,4,7. I could also observe the moulting of very small feathers which are still in the tubes or the tubes prevented the barbs spreading out 2,9. Particularly easy to recognize is often the swelling of the abdomen 2,3,4,7,9. The organs are enlarged which you can see through the skin. The abdomen feels as though the birds had swallowed stones and it seems to be coloured bluish 2,3,4 with folds and wrinkles as if the bird was dehydrated. Many dead birds had been fed!

"The most obvious change in a dead bird by the post-mortem examination is hepatitis (jaundice) and also more or less prominent aszites (Liquid in the abdomen caused by hepatitis) besides this degenerative inflamed processes on the spleen, kidneys, heart and other organs were found e.g. on the epidermis (skin) and feather follicle 3. The sick birds grow definitely slower after the 15th day 2,4,7,9 ~ the body as well as the feathers. You can easily see if a fledgling is sick by the weight gain. Make up a chart which shows the typical weight of your own stock.
An exact scale is of course necessary.
From the 16th day onwards the weight gain slows up and from the 19th to the 22nd day occasional weight loss can be observed. If the weight loss by the 20th day, lasts longer than one day it is definitely cause for alarm. The few fledglings that are nursed and brought up by a foster mother definitely live longer than their brothers and sisters who are brought up by their own parents. This could be a sign that the crop milk of the healthy nurse is better (contagion!?!). Nevertheless only few survived longer than 4 weeks. They remain undeveloped 2,3,4,7 (weakling) and among other things show signs of bad balance. Their feathers have no shine and are untidy with unclear markings and here and there feathers which stick out or are broken off. These birds are unsuitable for breeding. My experiments, to put the APV contaminated eggs into other nests were mostly unsuccessful. Some eggs were hatched but fledglings were killed promptly or not fed. Eggs of healthy budgerigars were hatched. The results of the examinations declare: The papovavirus is probably passed on through the eggs. The virus has been discovered in the eggs as well in the newly hatched. If the eggs of infected parents are given to healthy a nurse to hatch out, then the newly hatched are also infected - if infected parents are given eggs of healthy parents to hatch out then the newly hatched are also healthy.(?!) If the virus of dead birds is isolated and the newly hatched are inoculated with it,they die. In all cases the virus could be isolated again 3,4.

**What to do if the Papovavirus occurs?**
Stop the breeding of infected animals quickly. I advise you not to change eggs or fledglings around, otherwise the healthy animals will be infected. The remaining brooding couples must be carefully observed and at the first signs also stop. From now on do not pair up or let brood in. If several couples are affected, the whole breeding programme should be stopped for a few months to interrupt the virus life cycle 2,5. The quicker you stop the quicker you can start again. All animals should be brought together so that they come into contact with the virus and this way produce anti-bodies (natural Immunization) 3,5. This method is used in Japan. If only a couple is infected you should try totally disinfecting several times to prevent the virus spreading out - this couple and their offspring should be removed from stock. If further irregularities occur - stop! The absolutely necessary treatment of the whole stock should be done by a vet. To confirm the virus he will examine a diseased animal with special methods to identify it. Only he can prescribe medication to prevent germination so that the budgerigars immunity system can concentrate wholly in producing anti-bodies to fight the virus. He may propose a change in food as well as the doses of additional vitamins, minerals .... Experiments are being made in FRG at the moment with very promising results - more later.

**Important.** Your vet will prescribe you something for total disinfection - not every one helps! 2 to 3 hours must be reckoned with till it works. Stone floors - and walls should be intensively flamed off with a soldering lamp or electric blow lamps (e.g. to remove paint). Be particularly careful. The virus is extremely contagious and for a short time survives high temperatures
(about 60' centigrade). Absolute cleanliness, i.e. frequent disinfection of the hands, nesting boxes, breeding rooms, breeding boxes and apparatus is advisable, until no irregularities occur and all the fledglings have survived the moult. Regular disinfection should be done not only once a year.
**Last notes**
In my stock first the diseased parents, then one after the other, the "nurse" and newly put in breeding couples were affected. Also the non-breedinq stock fell in a permanent light moult and breeding laziness over a period of 2 months. The standard birds are particularly vulnerable. Only three pairs (all of the same line) proved to be resistant, i.e. none of the fledglings became ill. Also with some of the non-breeding older birds, a loss of wing and tail feathers can be observed. This is often connected with enteritis,and dark liquid droppings. The bird does eat but loses weight and dies. If other birds don't recuperate they must be removed from the stock.
Be generous! Every remaining diseased bird is a new danger for your whole stock. Take the virus seriously otherwise it may happen that in the new breeding season you will have many losses. All this brings us to the conclusion, that the spreading of the virus, e.g. through the crop milk,is just as possible as through the droppings of diseased animals and through the breeder himself. Certainly the contaminated dust of the feathers plays a great role as it is everywhere. Probably birds brought to shows bring the virus with them too.

Naturally the whole environment must fit! Check very carefully your own breeding equipment and methods. Be sure of fresh air and water, do not overcrowd and give plenty of minerals ........ don't give the virus another chance!

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* Information sources:
* 1 = Breeders information and other oral and written messages from various people.
* 2 = Notices from the author.
* 3 = Marie-Elizabeth Krautwald and Prof. Dr.E.F.Kaleta. Untersuchungen Zur akuten (Nestling-Hepatitis) Und chronischen (Franz3sische Mauser) Form der Papovavirus- infektion der Wellensittiche. Referat und Schriftverkehr ab 1985.
* 4 = G.Bernier and staff. Papovavirus Induced Feather Abnormalities and Skin Lesion in the Budgerigar: Clinical and Pathological Findings. Kanada 1981 und 1984.
* 5 = Stuber (AZ3098) Die Rennerkrankheit oder FM (1971), Dr. Oser (AZ 5552) FM: Erginzende Befunde - taken from AZ-pamphlet "DWV-Sonderteil Wellensittiche".
* 6 = Davis and staff. A viral Disease of Fledgling Budgerigars. Avian Dis. 1981.
* 7 = Katsuya Hirai and staff. Isolation of a Papovaviruslike Agent from Young Budgerigars with Feather Abnormalities. Japan 1984.
* 8 = Bozeman and staff. Charakterization of a papovavirus isolated from fledgling budgerigars. Avian Dis. 1981.
* 9 = Prof. Dr.E.F.Kaleta and staff. Untersuchungen zur Virusathiologie einer mit Hepatitis und Bef iederungstsrungen cinhergehenden Krankheit bei Wellensittich- Nestlingen (Melopsittacus Undulatus). Verlag Paul Paray, Berlin und Hamburg 1984.
* 10 = Martin Tzschachel. Dem Immunsystem helfen, damit es helfen kenn. P.M. Magazin 311988.
* 11 = Gloria V.E.Havenhand M.Sc., PhD. Stress Its effect on Budgerigars, Life Span and Breeding Performance. Budgerigar World, December 1987.