In-Breeding and Line Breeding

**An explanation of the terms, and their use in practice**

**by Kelwyn Kakoschke "Budgie News" January 1990**

The term in-breeding was coined in 1946 by Dr. Duncker as being the mating of related specimens.The practice and its name caused an uproar and was condemned by the church. English breeders coined the term "closed flock" or "closed herd" breeding. It meant exactly the same thing, but the terminology did not attract the same criticism. Eventually,the term line breeding came into use, being somewhat between the two terms then in use, but essentially, the three terms, in-breeding, closed flock breeding and line breeding all mean the same thing, the mating together of related specimens.

The interesting topic of in-breeding, condemned by some,praised by others, is almost an art form. What it allows you to do is to add to and take from any given specimen (if you are very skilful) points that you want to produce in future generations, so that you are virtually moulding and crafting its end result as you go.

When you cross-breed, and this is the alternative, you put together two unrelated birds, and as with a potter simply throwing two lumps of clay together and hoping to achieve a pleasing shape, the chances of obtaining the desired result is one in a million.

The only way you can control things is by some form of in-breeding. A great amount of work and skill must be put into it, and maintained, if the right result is to be achieved. This is where many people fall down. If you are going to in-breed, you have to keep up with the book work, and be very thorough in researching results. When you want to breed for one particular trait, you have to be certain that hidden traits in the family are not likely to override the one you wish to establish. Such things as poor hatch ability, infertility, physical defects or simply an exhibition fault which you hope to breed out. All these factors should be noted in the records and considered before pairing.

Every budgie has 29 pairs of chromosomes - on these chromosomes are what are termed loci - these are the holding position for the genes. If you imagine each chromosome as a long strand, on locations along this, hence the word loci, you have sets of genes grouped together which govern every characteristic of the bird, its ability to learn, structure, colour, feathering, etc., that this particular bird will ever have, and there are many, many such groups which go together to define a particular specimen. What in-breeding does is to cut down the number of different genes available on each of these loci, so that there is less choice when related birds are mated together, and a greater percentage of young come out looking the same, whereas when cross-breeding, the number of different genes available on each of these loci, remains constant, because there is no duplication of genes, as with related birds.

This is where the skill comes in, reproducing young who favour, say a superior cock bird. Having mated the cock and produced some young hens, you would consider putting the cock back to his daughter the next year, but this hen has half her father's genes and half her mother's genes, and if you choose the wrong hen, she may be carrying very strong sets of her mother's genes, and when mated back to the father, if these genes are the stronger, you will end up with birds similar to the first cross, with only single sets of the fathers genes, and the same number of the mother's genes, so you have got the disadvantage of in-breeding, and have come no closer to the final goal, and if you pick the wrong daughter again, and make the same mistake, you could go for generation after generation and still be no better off. So! The skill amounts to knowing the correct bird to use.

This is a classical example concerning the breeding of rats. An un- related pair of rats were mated, and allowed to grow to maturity. Then the two largest young were mated, and the two smallest. This process being repeated for seven generations, the largest of the largest and the smallest of the smallest being mated each time. After seven generations,the young of the large parents were twice as big as the original pair, whilst the young of the small parents were less than half the original size, it was also found that the young males were sterile and the young females could not reproduce.

These then represent the extremes. In-breeding is a tool and as such it can be used to shape and craft, but if abused, it will back away and destroy what you started in the first place. This has covered what in-breeding is, and its effects. In practice, how do you use it? When do you use it? Why do you use it?

Newer breeders should not use it straight away. What you have to do for a start is to produce specimens of a reasonably high quality, as stated previously, when you start in-breeding, you are not only fixing good points, but also fixing bad points, very, very strongly. What you have to ensure when you choose a bird for an inbreeding programme, it must be a very high quality specimen. To start with you must buy the highest quality specimens available to you and cross breed with these birds. The idea here is to find out what genes are available and to give yourself the greatest possible chance of finding a bird suitable for an in-breeding programme.   
As a rule of thumb, in assessing whether or not your own birds are of sufficiently high quality to use in an in-breeding programme, compare them with birds available to you from outside your own stud, if they are equal to, or better than your own, then your own birds are not sufficiently superior to be worth inbreeding with.

When your birds are of the right quality,and you are not able to go out and buy better it is time to get started. Go through your birds very very carefully and pick out say, the best 5 cock birds and the best 10-20 hen birds. What you do next is work out a breeding programme using these better cocks over several hens each, and use the rest of your stock as foster parents. You will then be in a position to compare the young from these few particular birds, and this is when some unusual results will be obtained, the reason being, that birds that have been crossbred do not breed true. Some birds will produce young of equal quality, for others the young will not be any where near the quality of the parents.

What this means is the number of poor genes that this bird is carrying is far too high and if you breed back to it, the poor genes would overcome the better ones, and the birds produced would drop off in quality quite rapidly. It will be apparent that not just having good birds will guarantee good breeding results. What you find is that out of five cock birds, there way be just two, that given different hen birds, will produce young of quite high quality, you can then say to yourself, here is the key, these are the birds I can start to in-breed with.

To set yourself up in a breeding pattern, you have to analyse these birds very, very carefully. If, for example, one of these cock birds is a very good specimen, but had a weak mask and spots, the one thing all his hens must have in common the next season, is excellent mask and spots, because when you breed back to him, the one thing that will stabilize itself is the weak mask and spots. You must ensure that any of the specimens mated back to a cock excel in any of the points where he exhibits weakness. This is where you have to be very critical of your own stock, not just the good points. You also have to be able to define a particular fault, so that each stage you come to, you are working to produce a superior specimen in two or three years time.

Having decided to improve the mask and spots of a particular cock, you would mate him to the best available unrelated hens excelling in mask and spots, and then you take the best of the young and mate half brother to half sister, or possibly one of his daughters back to him. What you are looking for, in their young, is what is known as crossover, where the good mask and spots, coming from both sides, through the hens, has crossed over and combined with the genes from the cock to fix themselves with all his desirable features. Now, the process is repeated all over again. The new improved cock is again analysed, the most prominent fault identified and he is mated to a group of unrelated hens, who once again, excel in this particular fault. In this way you get a steady progression, a steady climb, you practice the sculptors art, adding a bit here and there, taking, away that which you don't like, you are in control of the end result.

You must always be very careful, as you watch these features develop to look out for any hidden weakness in the line, such things as infertility or hidden faults, not apparent in the original cock, because as you breed back to his good points, so you also breed back to the bad traits and reinforce them also. It is essential therefore, to keep very careful records of all the birds, their strengths and weaknesses. Always remember that, as with any form of endeavour, the one who puts the most into it gets the most out of it. If you are not prepared to put the necessary time into this form of breeding, don't do it! A half hearted approach is courting disaster in the long run.