8. Local and exotic breeds

Many co-operative programmes to improve small animal production are based on the idea that good results can be obtained simply by transferring genetics. This is the biological equivalent of transferring technology. When the problem of fitness is posed, improvements through crossbreeding are frequently considered the best approach. The easy syllogism on which these ideas are based, is that since improved exotic breeds or hybrids are more productive in developed Countries, it is sufficient to introduce them, or part of their germplasm, to increase their output in developing Countries. Unfortunately it is not true that improved breeds or technologies can be valuable whatever the environmental and socio-economic conditions. Only if these are favourable are the results likely to be positive. A commonly observed constraint is that animals or eggs are sold as an item and not by weight. Local breeds can even be sold at higher prices because of their specific ritual use for sacrifices. When analysing the market it is therefore necessary to take this into account and ascertain in advance if exotic breeds can or cannot compete on these terms. If climate is not a constraint and sanitary, nutritional and marketing conditions are favourable, the move to improved production systems, adopting exotic breeds, is generally a natural process not needing any external stimulus. Unfortunately, measuring the success of a

project among low-food, no-income people is often carried out immediately after its termination when equipment and animals have only just been distributed so that production can begin. At this stage there has been no time to assess the impact of the external stimulus and a project may wrongly be considered successful.

This matter will be discussed in Chapter 18 (Testing success) but it is obvious that the sustainability of a project can often be assessed very quickly, without waiting months or years. Frequently elements of failure can be deduced directly from the description of the general conditions or from some peculiarity of the project. Improved breeds or hybrids are generally imported. If the replacement rate of culled animals is not considered, the project will quickly end because poor people have neither the economic nor technical means to import new animals.

The same can be said about vaccines or medicines. They are not available in rural areas and are rather expensive from town pharmacies, which sell in relatively large quantities. The low number of doses needed would mean that the majority of medicines would be wasted. In any case, no poor people buy a medicine to protect their animals when they have no means to cure their own children. Exotic animals are also demanding in terms of nutrition. Balanced feed, if available, would need to be bought. In rural areas feeding animals with expensive feedstuffs is only possible if production can be sold profitably at the market. In fact exotic breeds are only usually found in the peri-urban areas and are mostly kept by people who have some education and other income.

Suitability to the environment is generally low amongst exotic breeds, which have no chance when competing in natural conditions against local breeds. They are also larger, more exigent on feed quantity and quality and more sensitive to heat and sickness. Getting bigger eggs from exotic breeds is better than getting smaller eggs from Deshi (local) hens (figure 8.1.), but to get smaller eggs is better than collecting no eggs at all from exotic breeds.

Fig. 8.1. Exotic breeds produce bigger eggs (FAO/12654/F. McDougall, 1985). But bigger eggs have a cost. If the price is set by number rather than by size, then there is no advantage.

The analysis of the system must help to decide if it is

advisable to try and improve housing and management of local breeds to get more small eggs or whether it is preferable to improve genetics by introducing more productive but more exigent exotic breeds. Sometimes smaller eggs from local breeds receive a higher price than bigger eggs.

To improve poultry production (eggs and meat) in the Horn of Africa, Rhode Island Red cocks were distributed among villages. The idea was to introduce some new blood (genes) from the heavy exotic breed into the local smaller strain. Unfortunately, RIR cocks were unable to compete for mating with local light ones. A technician who had co-operated in the project reported that the trial had failed because there was no increase in body weight or number of eggs laid. It was then decided to re-introduce RIR cocks, but at the same time, remove the local cocks to avoid competition. Some eighteen months after the project had ended there was the chance of checking the results with the families who had received the cocks (Good and Finzi, 1987). These showed that in 37.0% of observed flocks,

morphological traits of RIR hens (bigger size, feathers features and feet colour) were completely absent. In 48.8% of flocks some trait was observed, but in less then 10% of the hens, and in 14.2% of flocks, traits were observed in 10% to 20% of subjects. The presence of the introduced RIR genetic pool was evaluated to be no higher then 7%, as a mean. This negative result was confirmed when eggs produced were examined. The mean weight (32.6 g) was even lower than the one observed (33.2 g) in controls involving pure local breeds. The shells were completely white in 60.0% of eggs, while 37.5% were a very light shade of brown. Only 2.5% had a noticeable brown colour. Considering that some light brown can also be found in eggs from local chickens the result of the two consecutive projects must be considered ineffective.

Many different reasons can explain the failure. For instance preference can be given to the brooding of small eggs or local birds brood better. But probably the true reason is that RIR chicks or cross breeds are not able to survive. The original cocks, in fact, soon died. When

ambient temperature begins to increase, heavier birds tend to stop scavenging and sit panting in the shade whereas smaller, slim, local birds still go around looking for food. Similarly, in the afternoon local chickens begin to scavenge earlier than the exotic birds. In these conditions it is easy to understand that these more exigent heavier birds, cannot cover their basic nutritional needs, let alone put on weight or lay eggs.

In figure 7.1.1.1. a flock is shown as an example of improving production through the substitution of local with exotic birds. Projects have also been based on the use of hybrids. This is not advisable because brooding capability is lost and dependence upon industrial units and importation becomes permanent. In any case light breeds are generally more suited to harsh environments. They are less exigent, more dynamic, more thermo-tolerant and, to a certain extent, can adapt to scavenging. A lighter body weight and a more dynamic attitude to scavenging makes it easier to cover their basic nutritional needs. Where a hot climate and insufficient feeding are limiting factors, Leghorn-derived breeds are more suitable (figure 8.2.) and may also be utilised to improve the genetic pool of local strains.

Fig. 8.2. Leghorn is probably the best egg-laying breed to introduce to tropical Countries, if conditions are not too harsh. Eggs are produced at a lower price and the large comb and wattles, naked legs and white feathers are all factors favouring thermo-tolerance.

The use of hybrids is less dangerous in rabbits. In this case animals are simply mated among themselves and with the next generations. A lot of different morphological types are produced and, at the end, the fittest are naturally selected. If living conditions are difficult it will be seen that, of the exotic or hybrids introduced, only those animals similar to the local breeds will remain. These local breeds are in fact nothing other

than animals previously imported that have undergone a local natural selection imposed by the harsh environment and scarce nutrition. Figure 8 3. shows how smaller local (Baladi means local) rabbits show a better thermo-tolerance compared with NZW (Finzi et al., 1992c). This is a very important fitness trait in tropical countries.

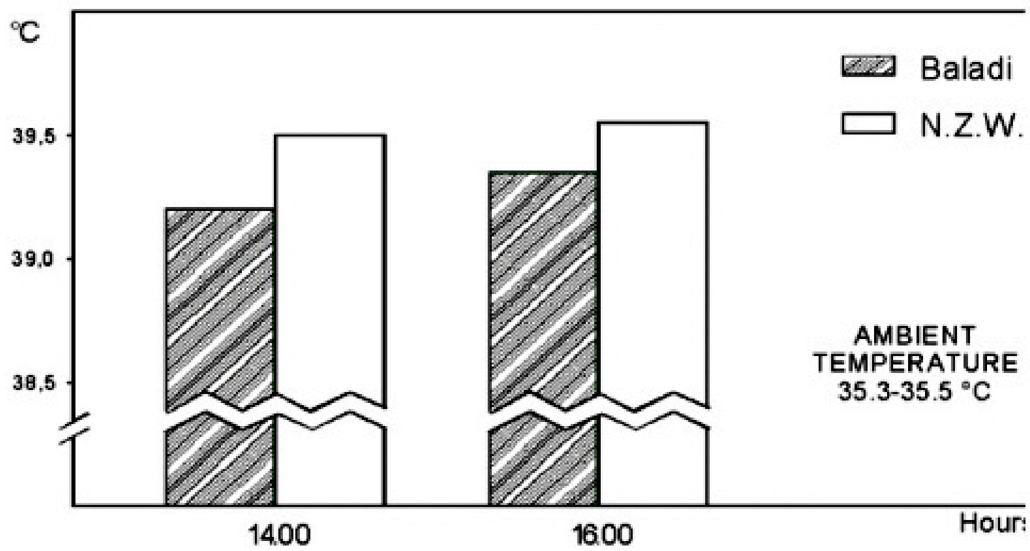

Fig.8.3. Baladi rabbits, a local breed in North Africa, are able to maintain a lower body temperature compared with NZW during the hottest hour of the day.

Exotic breeds are often considered more efficient because the interaction with the new environment is not taken into account, or it is artificially controlled in an unsustainable way. If a comparison is made with local breeds, it is generally performed by the experimental centres in artificial conditions. Frequently the tests are

limited to the first production cycle, may be in the most favourable season, and mortality is rarely considered. But tests should always be performed in field conditions (housing, feeding and management) or by simulating field conditions. They should last at least one year, and also consider substitution rate and marketing problems. Local experts frequently prefer to choose from heavy breeds (Flanders Giant and Bouscat Giant). They think that bigger animals give more meat. This is true with reference to the growing period, but heavy breeds are not competitive with medium size animals, which are raised in the industrial farms, the latter being more efficient in reproduction rate, prolificacy and feed conversion. The main problem is that their value in terms of breeding is practically impossible to ascertain. The only opportunity is when just one or few bucks are kept, and then phenotypic selection is based on maternal traits. Recording of reproduction data must be put into practice in the simplest way, by registering all of those weaned in order to calculate their number based on 100 or 365 days. The figure obtained can be utilised as a selection index, which to be reliable, should represent three or more weanings. The simplest option is to start with the animals that are already present (whatever they are) and begin to introduce a selection procedure. Breeding should take place in the natural environmental and nutritional conditions, so that both production and fitness are maximised in relation to the specific local situation. If the work begins with local strains, it is likely that output will be improved, and fitness maintained. In the case of exotic breeds, it is likely that output will decrease but fitness will be improve to reach a sustainable level of production. Anyway this is a more

expensive and more risky possibility because the imported animals may easily die. This kind of selection, based on natural and managerial factors, is very slow but permits a gradual adaptation to specific production conditions (Hammond and Galal, 1999). The same can be said for all the domestic species. The best rule is to look at the morphology of local breeds or strains and choose breeds with a similar body conformation. Generally speaking, smaller animals with an elongated body shape and wide ears or wattles show a better fitness in rural conditions. If the environment can be artificially controlled and marketing conditions are favourable, any breed or hybrid can be adopted. But this matter bears no relation to food security problems in the sense that the word security is used here. Breeding or demonstration centres generally utilise exotic breeds fed with balanced feedstuffs. But when these animals are distributed in rural areas it needs to be shown that they can remain competitive with local strains. It is well known that a reduction in body size is a good indication of successful biological adaptation to difficult environmental conditions. Other fitness traits are probably present in local strains. For instance they have a better thermo-regulation, and are able to maintain a lower body temperature in the stressful midday heat of tropical countries (Finzi et al. 1992b).

9. Small species and horticulture

When small production systems are analysed, it is common to see some vegetable production close to the dwellings. Some characteristics of these production

systems are very consistent. They are: limited in area and crop varieties; ruled by women; used for direct consumption. Fruit or shade trees may be present. From this horticultural production, the different vegetables produced can be collected and immediately utilised when necessary. The contribution of this activity to family welfare is very important (figure 9.1.).

Fig. 9.1. Sweet potatoes are cultivated in the backyard. The leaves are eaten by rabbits, a small animal species with which horticulture integrates perfectly, receiving manure and providing green forage.

However, this scale of horticulture is impaired by

scavenging birds (figure 7.1.2.1.2.) and free-range goats. The area should be fenced and the wings of birds must be clipped to stop them flying over it. If these precautions are not taken, no vegetal production is possible unless the animals are closed in or tied up. Goats are often constrained in some way, but it is not easy to do this with chickens or ducks which must either scavenge or be fed. As a result poultry production and horticulture are difficult to integrate in low-income areas and most frequently only poultry keeping is observed. If marketing conditions make it profitable to raise poultry in confinement, then integration is convenient since birds can partly utilise vegetal wastes and anyhow, they produce good nitrogen-rich manure. Another possibility is to allow birds to scavenge outside the backyard. At sunset chickens can be readmitted to the yard, by opening a passage leading to a coop that can be closed securely. Pigeons, if there are not too many, fly away to feed and do not interfere negatively with vegetal production. But the animals that integrate very well with horticulture are the mammals. These are commonly kept inside the house (guinea pigs), in cages (rabbits) or pens (pigs). Mammals eat most of the vegetal wastes coming from horticulture and they produce good manure, so the integration is perfect. It is also useful to teach people how to make good compost from any surplus waste materials. If a gutter is dug under the cages and a plastic sheet placed over it, the urine mixes up with faeces and fallen vegetal wastes, its nitrogen content is not lost and the compost is enriched as a result (figures 5.5.2. and 7.2.1.14.). This matter has been discussed in Chapter 6. (Differentiation and integration) A good example of multi-factorial integration is shown

in figure 6.8. Horticulture needs water. When there isn't enough water, small-scale horticulture can still be maintained by studying how to recycle cooking and washing water. Women generally provide this water. Sometimes they walk a long way to pits or rivers to fetch it and it should not be allowed to go to waste. For instance it is not strictly necessary to put salt in the cooking water, although it does increase the boiling temperature. Food may be salted after cooking and water can then be utilised to irrigate a small area. If water reservoirs are possible then fish production may also be feasible at backyard level (figure 9.2.).

Fig. 9.2. Tilapia is produced in this small water reservoir, which is also used for vegetable production in the backyard. Palm leaves are bent into the water to provide organic debri to fish.

Sometimes conditions are particularly favourable for integrating fish production into the backyard system (figure 9.3.). Carp and catfish are the species more commonly utilised. They are able to produce in warm stagnant water which is low in oxygen. Two small manuals have been prepared to help fish farming in developing Countries (FAO, 1981a, 1981b). The technology described is simple but oriented to a specialised production. Nevertheless they provide some good ideas and are also useful to help prepare and utilise small ponds.

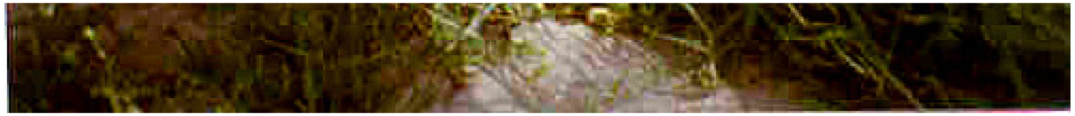

Fig.9.3. This fishpond was easily dug in few weeks by a team of five men. It receives water by filtration from the lake that can be seen in the bottom of the picture.

The pond shown in the figure is rather big, but much smaller ponds can still give a good output. The water plants provide an organic substrate to favour the formation of algae but also, and as is seldom appreciated, make it more difficult for fish to be stolen using a net. When the system is well integrated, the ponds represent a water reservoir for horticulture, fish are produced and raising ducks is favoured. Duck's droppings manure the pond and when the fish are gutted, ducks can consume this waste as a protein source.

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