SECTION IV

RELEASE OF CAPTIVE-BRED SPECIES: GAMEBIRDS

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INTRODUCTION

Captive bred gamebirds are released into the wild for three reasons. First, they may be reared in large numbers for their sporting value eg Pheasant *Phasianus colchicus*, second, scarce species may be bred in captivity with the eventual aim of 'topping-up' ailing wild populations or for re-introduction to areas where the species has become extinct eg Cheer Pheasant *Catreus wallichii*, Capercaillie *Tetrao urogallus* and third, novel species may be introduced to areas outside their natural range eg Partridge *Perdix perdix* to North America.

The problems associated with such releases are that:

(1) undesirable genes may be introduced into the native population,

(2) there is a possibility of genetic changes through hybridization with related taxa which could thereby dilute or eliminate a native population,

(3) diseases may be introduced from captivity to which the native birds are not adapted.

On this last point, Ridley (1986) has gone so far as to state that captive reared birds should 'only ever (be) released in areas where their wild conspecifics are extinct. To reintroduce merely as a way of boosting a local population is utterly irresponsible. It risks introducing disease and it cannot possibly help the wild birds'. It is probably the same or closely related species that will mostly be affected by novel parasites (de Vos *et al.* 1956).

In fact, most gamebird introductions, for one reason or another, appear to be failures (de Vos 1977, de Vos *et al.* 1967); up to 1948, 30 species had been released into the USA, but only four remained as propagating populations by 1988 (Ebenhard 1988). Nevertheless, the pressures to propagate endangered species in captivity are considerable. Seventy-one species or distinct races of Galliformes (gamebirds) are listed in the Red Data Book (IUCN, Geneva), and of these, 27 are considered as endangered. With improvements in rearing techniques, captive breeding projects are feasible, but reintroductions are likely to succeed only if conditions which caused the original decline in the wild (usually habitat deterioration) have been rectified. This is seldom the case. Neither Warland (1975) nor Fyfe (1978) were able to document an endangered or threatened bird species that had been restored to a self-sustaining wild population as a result of releasing captive-reared birds, although since then some birds of prey, and the Masked Bobwhite Quail *Colinus virginianus ridgwayi* show promise of success (Scott & Carpenter 1987).

The liklihood of hybridization among released and wild gamebirds is a very strong possibility, and was a feature of the re-introduction of the Capercaillie to Scotland as birds dispersed. In this case, the hybrids with Pheasant and Black grouse *Tetrao tetrix* posed no threat, and they are seldom recorded in the wild today. Johnsgard (1983, Table 10) records 16 types of natural interspecific hybridization in the Tetraonidae (Grouse and Ptarmigan) involving 12 of the 16 species. The three most frequently occurring combinations among wild birds involved pairing by lek-forming species. The probability of hybridization when a wild population is suddenly flooded with large numbers of reared birds must be high (assuming the released birds survive).

Actual case histories concerning the fate of released individuals are few and documentation is poor. This is mainly because lamentably few released birds have been marked with a view to following up their survival and effect on wild populations. The examples given below are the most relevant I can find in the literature. This is really an extraordinary situation considering the time and resources that have gone into rearing gamebirds for release. Glutz von Blotzheim *et al.* (1973) sum up the situation in their reference to the release of Partridges as '... questionable experiments (which) seem to be entirely without competent controls and sound documentation'.

CASE HISTORIES

Red-legged partridge *Alectoris rufa*

This was first successfully introduced to Britain, in Suffolk, in 1790, and its spread was assisted by many further introductions (Cramp & Simmons 1980). Releases continue, although Potts (1988) states that there is increasing evidence that some reared gamebirds breed less successfully after release than their wild, naturalized counterparts; these differences may be due to the relative naivety of released birds to predators (than presumably to any inherent genetic defects in the released birds, although this is not stated).

Closely related Chukar *A. chukar* and Chukar x Red-leg hybrids, which are cheaper to produce than Red-legs, have been released on the Sussex Downs in large numbers (an average of 2700 p.a. for about 10 years) for shooting.

However, they bred very poorly in the wild, producing only 20-30% of the young fledged by Red-legs. The wild Red-legs which hybridized with released birds (about 9% of the population compared with the 72% expected to do so on a random basis) produced only 0.3 young per old bird compared with 1.14 for wild pairs. The reason for the difference is unknown, but Potts (pers. comm.) suggested a genetic trait for faulty incubation behaviour as a possibility.

The main problem with such releases is one of gamebird management. Continual releases and subsequent shooting of large numbers of birds (which includes both released and wild birds) on the Downs and elsewhere leads to the danger of the wild birds being shot beyond their capacity to replace their numbers. If maintained, this can lead to local extinction of the wild stock. Density dependent predation on the exaggerated stock will have the same affect (Hill & Robertson 1988). As a result, the Game Conservancy has recommended that the Game Farmers' Association be asked to draw up a plan to phase out releases of chukar and hybrids as soon as possible.

Barbery partridge *A. barbara*

Numbers have apparently been maintained in Sardinia, aided by introductions and despite hunting pressure, but no details are available (Cramp & Simmons 1980).

Grey partridge

(a) In Italy

At present, 275 000 hand-reared birds are released annually, and around 5% of the population is shot each year. This level of shooting is too great for the wild population to sustain itself, but the partridge can be maintained indefinitely as long as releases are continued. The hand-reared birds are less successful breeders and produce fewer chicks than their wild counterparts (Robertson & Rosenberg 1988).

(b) In Britain

Although Potts (1986) suggests that the poor success of releases may be due to birds having been bred from long lines of game farm stocks with genetic weaknesses (no data presented), he considers the most important factor to be that released birds have poorly-developed predator avoidance behaviour. Their reaction to alarm calls is not instinctive, but conditioned by learning and experience (as shown for the Rock Partridge *A. graeca*). Brooder reared chicks are deprived of the behaviour which wild chicks derive (non-genetically) from their parents. However, an effect of releases is that surplus wild males do have a chance to breed, and in France, pairs containing a wild cock and a released hen had only 11% fewer chicks than wild pairs (Birkan & Damange 1977).

Potts' (1986) conclusion is that there are so many questionable features of releasing Partridges for re-stocking that it should not be regarded as beneficial to Partridge conservation, at least using present methods.

Pheasant

This species, the most widely released game bird, further emphasises the attendant problems. In particular, predation of naive birds can account for 90% of the high losses (81%) suffered by released birds in their first month (Hessler *et al.* 1970). In Ireland, only 12% survived from their first to second winter compared with 20-50% survival by wild birds (Robertson 1986). Hand-reared birds had lower rates of territory establishment (50%) and a one-third smaller harem size than wild males. About 80% of wild pheasants mated with a wild rather than a released bird, with males having harems of up to 10 hens with no decrease in fertility. Released males could only increase chick production if insufficient wild males were available.

Reared stock could have genetic defects, inbreeding depression and a lack of competitive ability in the offspring (Woodward *et al.* 1983). In Poland, pheasants released after 20 generations in Pheasant farms survived only half as well as the offspring of wild born Pheasants which were reared and released in exactly the same way (Pielowski 1981). They differed in gut morphology, biochemistry of tissues, and chick behaviour (Majewska *et al.* 1979).

Hill and Robertson (1988) state that, 'although the genetic quality of hand-reared birds may be reduced in some circumstances, it does not seem a likely cause of the dramatic differences found between wild and hand-reared birds'. They have no hard data to support this other than the undisputed fact that most released birds die, not from genetic defects, but poor management at the release site leading to massive early mortality. Nevertheless, the possibility of the survivors introducing undesirable genetic material to established wild stock must surely remain a distinct possibility.

Cheer Pheasant

This is an endangered Himalayan Pheasant that breeds well in captivity. Between 1978 and 1984, 152 poults ~~have been~~ were released into suitable habitat in Pakistan, from which they ~~are~~ were believed ~~now~~ to be extinct. None of these survived (Young *et al.* 1986). A further 200 poults (100 of each sex) were released in 1988, and at least 2 pairs bred in 1989 (P. Garson, pers. comm.)

Red Grouse *Lagopus l. scoticus*

Large-scale releases on a moor in NE Scotland in the 1960s were not experimentally controlled. A PhD student at ITE Banchory has reared grouse in captivity for a study of diet. In late July 1989, the 60 full-fledged poults were released on to a moorland with a wild population. All were marked and 10 carried radio tags. By mid-October, only two radio-tagged birds survived; the others were either missing or killed by a predator. Counts have yet to be made to ascertain survival of the 50 colour-marked birds. Although a secondary feature of this study is to determine whether and how captive-reared grouse are assimilated by wild populations, if successful, it could be further extended to follow-up breeding performance of the once-captive birds of known origin. As with any PhD study, the timescale is against long-term monitoring, even assuming the released birds do actually breed.

GUIDELINES

There is disappointingly little information in the gamebird literature on the genetic effects on wild birds attributable to released stock. In fact, there seems to have been few advances since Leopold's (1938) comment concerning the release of exotic gamebirds in the USA that 'it has depleted the game funds of 48 States for half a century, and has served as a perfect alibi for postponing the practice of game management'.

1. Scott & Carpenter (1987) emphasize that translocation and re-introduction of birds into the wild, if they are to be viable management tools, must have an objective measure of success for the procedures. This may seem obvious, but in most cases, for gamebirds at least, the data are not available.

2. Releases are frequently concerned with scarce species. The chance of rare genes being lost is high, and it is these that could affect survival in a crisis. It is clearly important to maximize the size of founder groups, and a minimum of 50 wild and released seems a good working number.

3. Introduced closely related species may completely swamp native populations genetically (Ebenhard 1988, Johnston *et al.* 1988).

4. It is important to select birds with genetic traits and behavioural backgrounds that will enhance their survival in the environment when they are released. Release stock should have been kept for as few generations in captivity as possible (Fyfe 1978).

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