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THE POTENTIAL CONTRIBUTION OF AVICULTURE TO CONSERVATION BREEDING OF ESTRILDID FINCHES

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Introduction

Captive breeding may be the last resort for many species which are on the brink of extinction and whose natural habitat is no longer able to sustain them. It has been used successfully to maintain populations of several species, including the Bali Starling or Rothchild's Myna *Leucopsar rothschildi* (Taynton & Jeggo, 1988), Hawaiian Goose *Branta sandvicensis* (Black et al. 1991; Black, 1995), Californian Condor *Gymnogyps californianus* (Toone & Risser, 1988) and Mauritius Kestrel *Falco punctatus* (Jones et al. 1995). So far, the prime responsibility for maintaining breeding programmes has fallen on zoological gardens and/or specialist organisations, such as the Wildfowl and Wetlands Trust and the International Crane Foundation (Stewart, 1989). However, zoos and wildlife parks have insufficient staff, space and financial resources to cope with the huge range and number of species that are currently endangered, and which could benefit from captive breeding. Even with the enlightened approach to conservation that is now prevalent, the scope for captive breeding is limited. Tudge (1991) estimated that, if all of the world's zoos collaborated together, it should be possible to establish captive breeding programmes for no more than the 800 species of mammals that will require help in the next 200 years (see also Magin et al. 1994). This would be a commendable achievement, but it is put in perspective by the plight of just one other class of vertebrates, the birds. According to Collar et al. (1994), 1,029 of the 9,000 or so species of land birds are currently at risk, and a further 637 are near-threatened.

However, members of many amateur organisations also keep and breed animals in captivity, and several of them cater for species which are not normally given high priority in zoos. The UK-based Australian Finch Society (AFS) is one such organisation. It was founded in 1971 to cater for hobbyists who are interested in keeping and breeding Australian grassfinches, belonging to the family Estrildidae. There are 19 species (Immelmann, 1965) but, one

of them, the Zebra Finch *Taeniopygia guttata*, was excluded from the AFS remit from the outset because its interests were catered for by the Zebra Finch Society. However, the AFS subsequently decided to embrace the 11 species of Indo-Pacific and Pacific parrot finches *Erythrura* spp., which are also members of the Estrildidae (Ziswiler et al. 1972; Evans & Fidler, 1990). Their inclusion was justified because the range of one species, the Blue-faced Parrot Finch *Erythrura trichroa*, includes Cape York, on the north-east tip of Australia. There was an international trade in wild-trapped Australian grassfinches prior to the Australian Government's ban on the export of its native flora and fauna in 1960. Wild-caught birds have not been available since then. Some of the parrot finches are still trapped in the wild in Indonesia and the Philippines and available to aviculturists from these sources.

The AFS has some 500-600 members, most of whom are based in the UK. The AFS became interested in establishing conservation breeding programmes for species which are threatened in the wild and those which are endangered in captivity. It set-up the Rare and Difficult Species (RADS) scheme in 1995. Initially, four species were selected for inclusion in the scheme: the Gouldian Finch *E. gouldiae*, Bamboo Parrot Finch *E. hyperythra*, Pin-tailed Parrot Finch *E. prasina* and the Tri-colour Parrot Finch *E. tricolor*. It was expected to increase this number as the scheme progressed. A specialist group of eight to ten experienced breeders, with one of them acting as Group Manager, was formed for each of the selected species. The objective in each case was to set-up a viable breeding programme for the species and to develop and record husbandry techniques. Special attention was given to the use of studbooks (Olney, 1990). Each bird in the scheme was identified by a special RADS ring, provided by the AFS, and breeding records were collated centrally. They were kept on the Single Population Analysis and Records Keeping System (SPARKS), which has been adopted widely by zoos and wildlife parks. It enables the ancestry of individual birds to be traced, and inbreeding coefficients between potential mates calculated so that pairings between closely-related individuals can be avoided. Group managers were expected to direct exchanges of birds between breeders, in much the same way as happens in programmes operated by zoos. The AFS also recognised the importance of field work, although this was unlikely to be undertaken by many of its members. Nevertheless, it could be encouraged by, for example, support for scientific research to: (i) gain information about food, breeding and habitat requirements of wild birds in order to develop improved husbandry techniques for captive ones; and (ii) provide information on the general ecology of the species in order to assess their conservation status and develop plans for the management of wild populations.

It soon became clear that the original formula for RADS was too prescriptive. The procedure of record keeping, in particular, was unrealistic and too demanding for amateur aviculturists, whose main motive in joining the hobby was often in the pleasure derived from keeping captive birds. Another problem was that members of RADS groups were reluctant to exchange birds simply on the instructions of the Group Manager. Furthermore, a relatively small proportion of the AFS was involved in the scheme and it was seen by many members as being elitist.

The scheme was therefore revised in 1997 so that all members of the AFS could be involved. It was decided that all species within the AFS remit should be included in the new project, RADS PLUS, so that any member keeping them could be involved. Informal groups dedicated to particular species would be formed but centralised studbooks would not be kept. However, although the more flexible arrangement was expected to bring advantages, there were also disadvantages. For example, the lack of control of stock makes it more difficult to avoid inbreeding. It was argued that the way forward was to educate AFS members, and raise their awareness of bad avicultural practices, so that the AFS as a whole contributed to the conservation effort on a voluntary basis.

The object of the present paper is to assess the potential contribution that the AFS can make to the long-term conservation of estrildid finches within RADS PLUS and the changes in husbandry techniques that will be needed if its potential is to be achieved. It is based primarily on a questionnaire, which was sent to all members of the AFS as part of the RADS PLUS initiative, in order to census birds kept and bred by them in 1997 and 1998. This was needed to assess the status of species in captivity, and identify those species which are in need of conservation action either because of their status in captivity or in the wild. The census was also designed to identify some of the husbandry techniques, such as selecting for certain traits, and using Bengalese Finches *Lonchura striata* dom. as foster parents to rear young, which might be considered to be bad practice as far as conservation breeding is concerned.

Methods

Questionnaires were sent out to all members of the AFS in March 1998 and February 1999. Each was sent with a stamped addressed envelope for reply as means of encouraging a good response.

Members were asked to provide the following information:

1. The numbers of finches kept at the end of the previous year (December 31st), listing separately adult males, adult females and juveniles in two categories: (i) normals (i.e. the species as it normally occurs in the wild); and (ii) colour varieties that have arisen in captivity.

2. Details of the colour varieties kept (i.e. white-breasted Gouldian Finch, yellow Star Finch *Neochmia ruficauda*).
3. The numbers of finches bred (i.e. surviving until fledging) during the previous year.
4. The numbers of Bengalese Finches kept, and the numbers of Australian and parrot finches which were parent-reared or foster-reared by Bengalese Finches.
5. In the case of Gouldian Finches only, the numbers of normals and colour varieties which were parent-reared or foster-reared by Bengalese Finches.

Results

291 questionnaires were completed and returned for 1997 and 190 for 1998, representing 50.2% and 32.8% of the AFS membership respectively.

Fourteen of the 19 Australian grassfinches listed by Immelmann (1965) and eight out of the 11 parrot finches (Ziswiler et al. 1972) were kept by at least some members of the AFS in both 1997 and 1998. The Gouldian Finch was easily the most commonly kept species. It was included in more than 70% of the returns in both years (Table 1). There were more than 3,500 Gouldians in 1997 and 1998, averaging more than 20 of these finches per breeder. Large numbers of them were also bred in both years of the census.

The Longtail Finch *Poephila acuticauda*, Star Finch *N. ruficauda*, Bicheno *Taeniopygia bichenovii*, Diamond Firetail *Stagonopleura guttata*, Cherry Finch *N. modesta*, Chestnut-breasted Mannikin *Lonchura castaneothorax*, Parson's Finch *P. cincta* and Masked Finch *P. personata* of the Australian grassfinches, and the Red-headed Parrot Finch *E. psittacea*, Blue-faced Parrot Finch and Tri-coloured Parrot Finch, are also well-established in captivity. In each case, more than 10 breeders kept the species, more than 100 individuals of that species were owned by them and more than 50 birds were bred per year.

The status of other species in captivity is probably less secure. This applied to five Australian finches, the Crimson Finch *N. phaeton*, Painted Finch *Emblema picta*, Red-browed Finch *N. temporalis*, Yellow-rumped Mannikin *L. flavipryma* and Pictorella Mannikin *Heteromunia pectoralis*, and five parrot finches, the Pin-tailed, Bamboo, Peale's *E. pealii*, Katanglad *E. coloria* and Papuan *E. papuana*. They were kept by more than 10 breeders, who between them owned over 100 birds, and over 25 young were bred per year.

Each of the three naturally-occurring head colour morphs of the Gouldian Finch is kept in captivity, although the relative proportions in which they are kept by AFS members is different from those in which they occur in the wild. About 75% of individuals in the wild are black-headed, and 25% are red-headed; the yellow-headed morph is unusual (Evans et al. 1985, Evans & Fidler, 1986). Roughly one third of the captive population was red-headed



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