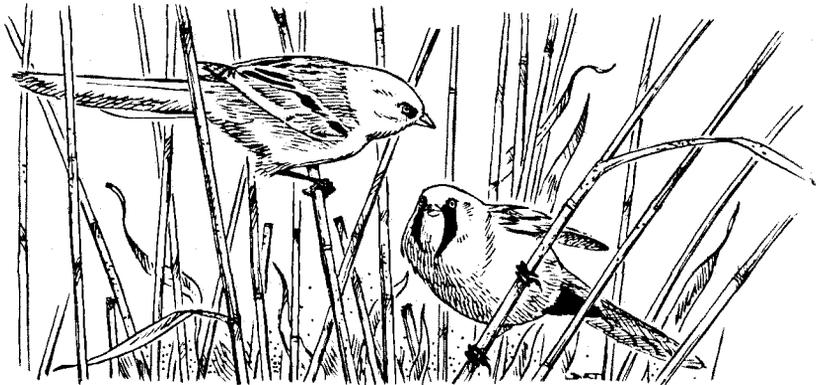


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186. Bearded Tit



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The Bearded Tit (as I shall insist on calling it) *Panurus biarmicus* is a rather peculiar bird. Taxonomically, there is nothing else like it. It even has a newly described species of feather mite not yet known from any other bird (Cerny 1978). It is confiding and locally numerous so has been quite well studied. Nests are not easy to find, especially without damaging the vegetation, so its breeding biology is not fully known. Bearded Tits are easy to mist-net, so have been much ringed with some interesting results.

The bird is not a tit of the *Parus* kind in any way; it has merely acquired an impressive vernacular name. It may be classified in the Paradoxornithidae, a family (or sometimes a sub-family ending in -inae) whose name implies some difficulties. The rest of this group are parrotbills of eastern Palearctic and Oriental distribution. They are babbler-like and sometimes included in the Timaliidae, which is itself a large and miscellaneous group. The Bearded Tit is the only species in its genus and is not much like any of its taxonomic neighbours. If the Bearded Tit does belong to the family Para-



235. Adult male Bearded Tit *Panurus biarmicus*, Norfolk, May 1943 (Eric Hosking)

doxornithidae, then the family is wrongly named. It should be Panuridae, derived from the first named genus within it. Field ornithologists will prefer to ignore these niceties and take it that there is nothing else much like the Bearded Tit. It is not related to the Penduline Tit *Remiz pendulinus* or to the Long-tailed Tit *Aegithalos caudatus*. These just happen to be two more birds without totally logical vernacular names, whose resemblances to the Bearded Tit are fortuitous or the results of convergence.

The taxonomic position has caused problems for the tidy-minded over the bird's vernacular name. There has been a recent but not consistent tendency to offer the rather clumsy Bearded Reedling as an alternative. Reedling is an old local name which has a certain charm and appropriateness though is perhaps a bit whimsical to modern tastes. It would do perfectly well without being qualified by Bearded, since there are no other birds in the genus. Calling this species the Reedling would be analogous to the maintenance of Dunnock for *Prunella modularis* rather than renaming this bird as the Common or Hedge Accentor. A third option, suggested by

Voous (1977) and supported by Dr J. T. R. Sharrock (*in litt.*), would be Bearded Tit Babbler or Bearded Tit-babbler. Personally, I find this new, clumsy, and artificial. If these are acceptable faults, then Bearded Parrotbill would be tidier and would better match the family in which the species most happily resides. Who would swallow such a change? So why not keep the accepted name of Bearded Tit? I am unsure why the name-changers have not had a go at the Long-tailed Tit on the same grounds of not being a proper tit. Long-tailed Scrubling? Heaven forbid!

Bearded Tits are unmistakable. The male is a strikingly beautiful bird, differing from the predominantly cinnamon-brown female in having a grey head, black undertail-coverts and black 'moustaches'. The whirring flight is characteristic of that of birds with short wings and long tails; they are also often seen climbing and hanging in reeds, with great agility and some comedy when, for instance, perching on two stems being blown in the wind. Few people may realise how at home the Bearded Tit is on the ground, where it hops along the mud with tail cocked. Compared with the real tits, with tree-searching adaptations, the legs are longer and the feet less powerful. On superficial examination, one might guess that this was a terrestrial bird rather than a climber. The bill lacks the power of the true tit's: it is conical and rather fine, most closely resembling that of a *Carduelis* finch. This is a clear case of convergence to a bill design suitable for precision extraction of rather small seeds. There is a marked sexual dimorphism in bill size, not simply caused by differences of body size, which are small. No studies have been made to ascertain the significance of this.

Juveniles differ from adult females in being short-tailed and having a bandit-like black face mask. Their sex can be determined by bill colour: brown in the case of females and yellow in males. After the autumn moult, first-years are indistinguishable from adults. Bearded Tits can be elusive in dense reed-beds, especially out of the breeding season and in wind of any strength. They are then detected by the characteristic 'pinging' contact call usually uttered by a moving group. Inexperienced or over-optimistic observers can be misled by the call of the Reed Bunting *Emberiza schoeniclus* which frequently emanates from unseen birds in the same habitat. The Bearded Tit call is, however, quite distinct and should be recognised with certainty even if the birds remain hidden. Vocalisations are described and discussed by van den Elzen (1977a).

On a world scale, the Bearded Tit occurs in a band from western Europe to the Far East. It is patchy in occurrence because of its requirement for reed-beds; since these are everywhere being eliminated by drainage, some sites are rather isolated from their neighbours. Taxonomists have worked up several controversies on the distribution of subspecies. The simplest view is that there is clinal variation, with the plumage being darker and more brightly coloured towards the west. This range of variation can be split into two, with the western birds being the nominate subspecies and the eastern *P. b. russicus* adjoining somewhere between eastern Europe and the Middle East, where the clinal variation is most sharply marked (Vaurie 1954, 1959). Kumerloeve (1958) named a subspecies, *P. b. kosswigi*, from Amik Golu (Turkey) from two skins of each sex which were said to be



236. Adult male Bearded Tit *Panurus biarmicus* at nest with five young, Norfolk., June 1952; note black 'face band' (Kevin Carlson)

unusually reddish-brown. Spitzer (1973) rejected this race, but resurrected *P. b. turcestanicus* for all those east of the Caspian. I suspect that this debate will continue, but doubt its productivity. There is great individual variation in some characters, and only a small number of skins available for study from the critical areas.

In western Europe, there has been a recent increase in numbers and range. Creation of the Oost Flevoland polder in the Netherlands raised that country's population from a few hundred to a few thousand pairs in the

early 1960s. Irruptive movements spread birds in Britain, Ireland, Scandinavia, France, Germany and Italy, with many records of new breeding sites and range expansions in the last 20 years. A spectacular colonisation occurred in Sweden, particularly at Lake Tåkern. The first record in the country was in 1965, yet by autumn 1974 there were 5,000-10,000 individuals at Tåkern alone (Björkman & Tyrberg 1982). This nucleus now repopulates smaller outlying colonies which tend to disappear in bad winters, while the main colony is so huge that it would be most unlikely to be eliminated by less than a run of bad winters perhaps coupled with an increase in commercial reed-cutting.

Numbers in Britain have also shown recent increases. In the early part of this century, the species was rare and confined to the extensive reed-beds of the Norfolk Broads. Numbers had probably been reduced by loss of sites and the species was also subject to much human persecution. Eggs were worth four shillings a dozen, so were much collected (Booth 1881 and further references in Axell 1966). Only 2-4 pairs were known in 1947 after reductions caused by the 1946-47 winter. A few years later, coastal floods damaged many sites, so recovery was slow. Ten years later, substantial irruptions started to occur at the larger colonies in East Anglia, and this heralded the beginning of a period of range expansion in Britain (Axell 1966; Newton 1978). The population was estimated at 590 or more pairs in 11 counties in 1974 (O'Sullivan 1976) and may subsequently have reached higher numbers. Local increases may be spectacular. For example, Leighton Moss in Lancashire was colonised in 1973, when one pair bred; this was followed by three, six and 16 pairs in the next three summers (Wilson 1977). The species now breeds regularly at 36 of the 109 reed-beds larger than 2ha in England and Wales (Bibby & Lunn 1982). It has spread farther than shown by Sharrock (1976) and is distributed from Kent to the southwest, and north to Yorkshire and Lancashire, with an outlying colony in the Republic of Ireland. Most suitable sites are probably now occupied. Many of these reed-beds did not even exist early in this century, when Bearded Tit numbers were very low.

Spitzer (1973) postulated that the recent increase in numbers in western Europe was due to the spread of the eastern race *P. b. ruscicus*. He alleged that the nominate subspecies lacked the gut adaptations for winter seed-eating and, as an insectivore, was incapable of surviving in areas with regularly cold winters. Mead & Pearson (1974) drew attention to the fact that Bearded Tits were present in Britain at least 300 years ago (Ray 1674) and so must have lived through the severe winters of Dickensian and other fame. Furthermore, they were described as eating reed seeds and having appropriate guts 150 years ago, and have presumably done so for a good deal longer (Yarrell 1839). Spitzer's hypothesis therefore lacks support from the evidence. Similarly, I do not see why the 'catastrophic selection' resulting from heavy mortality in 1947 (Richards 1975) should have rendered the species so dynamic. If there were dispersive individuals in the population able to colonise new and remote sites, they could have done so if their more sedentary kin had not all died.

It seems to me that the sudden spread of the Bearded Tit has something



237. Adult male Bearded Tit *Panurus biarmicus*, Yugoslavia, June 1978 (Kevin Carlson)

of the same inexplicability as do range changes of any species. I have doubts about the involvement of different subspecies of rather dubious differentiation and recognisability. Perhaps the expansion was caused primarily by the huge numbers produced on the new Dutch polders. These certainly irrupted in autumn and were probably the colonists of many new areas. A second point deserving attention is that—unlike, say, the Collared Dove *Streptopelia decaocto*—the Bearded Tit had a fragmented distribution in western Europe before its expansion (there is a good map in Björkman & Tyrberg 1982). Apart from its expansion northwards into Sweden, it has therefore more filled in gaps in its distribution rather than expanded into virgin territory. This suggests that it probably experienced a range expansion followed by a contraction at some unknown time in the past.

Bearded Tits are insectivorous in the summer, but switch to seed-eating from the late autumn to early spring (Bibby 1981). This involves marked changes in the gut anatomy (Spitzer 1972). They tend to catch relatively slow-moving insects, with chironomids (non-biting midges) gathered from the water's edge featuring frequently. During the breeding season, they may be able to catch large numbers of the larvae or pupae of various wainscot moths which as caterpillars feed within the reed stems but emerge to pupate. These pale cream caterpillars can sometimes be recognised at long range as the major foods being brought to a nest. Seeds taken in the winter are most commonly those of the common reed *Phragmites australis* but may include other grasses and sedges. Especially in autumn, wandering flocks may be found in beds of common nettle *Urtica dioica* or great willow-herb *Epilobium hirsutum*, taking the seeds; mixed flocks may be with species such as the Redpoll *Carduelis flammea* (Bibby 1974).

Bearded Tit nests are large and rather untidy, built of dry leaves of reed and other grasses. They may be supported on piles of old collapsed reed stems, but tussocky sedges such as greater pond-sedge *Carex riparia* or great fen-sedge *Cladium mariscus* growing under the reeds seem to be preferred. They are easy to pin down from afar, given a good view over the reeds, but can be challenging to find when one is close in under a reed canopy and stepping cautiously through a thick tangle of herbage trying to avoid

damage to the site. The dropping-in place of the adults is invariably a little distance from the actual nest, sometimes as much as 5m.

The essential habitat requirements for breeding are suitable nest sites and feeding places. Nests are likely to be in the drier parts of reed-beds which support the better undercover. They are unlikely to occur in areas which are cut regularly for thatch and have straight clean stems with nothing below. Feeding places are most likely to be wet, especially along margins with open water where emerging chironomids may collect or be drifted by the wind. Some tidal beds on riverine silts may be very productive

238. Adult male Bearded Tit *Panurus biarmicus* with young in nest, Norfolk, May 1943; note nestlings' conspicuously spotted gapes (*Eric Hosking*)



of insects and also provide good feeding conditions. The tendency for the best feeding and nesting sites to be some way apart means that adults provisioning young may have to travel considerable distances, sometimes several hundred metres. Several pairs may make similar journeys from a suitable nesting area to a particularly rich food source. Good feeding places can shift suddenly from day to day as a change of wind direction or a synchronous emergence of chironomids or wainscot moth larvae suddenly produces rich patches which can vanish almost as fast.

Breeding may begin as early as March (Spitzer 1972 and references therein). Even within Britain, there may be a regular difference of as much as a month between sites. The earlier sites are generally those with wet eutrophic conditions, while breeding in the tidal beds is normally later. These differences undoubtedly reflect differing abundances of food in the spring.

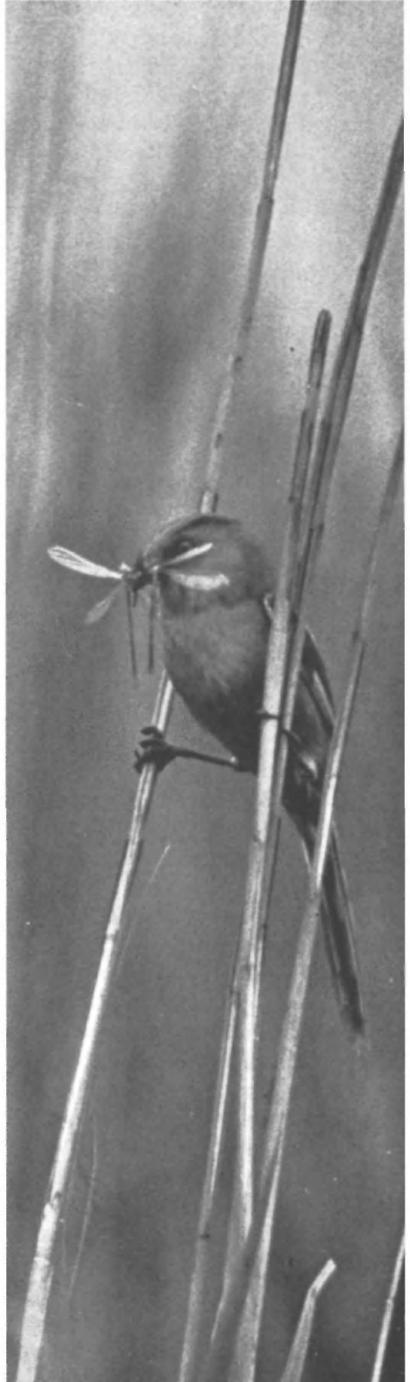
Nests are built by both sexes, though males may take a greater share. There is some 'courtship' feeding. Clutches are relatively large, usually five or six eggs. Incubation and care of the young is shared by both sexes. Breeding is rapid, with a short fledging period and a fast start on another brood. Two broods are regularly reared in a summer, three frequently and four probably not uncommonly. Breeding may continue as late as September. The total number of broods per pair and young reared per season undoubtedly varies between sites and seasons. It is very difficult to study, even with marked birds, because pairs may move some distance between attempts and the action can be so fast that it is difficult to keep pace. My own attempted study of this failed because I was unfortunate to choose a site and year in which the population was smaller than expected and food was scarce, leading to widespread failures from starvation. Nest failures from predation are probably normally low, though flooding can cause major losses. I have, however, watched a nest which produced young in spite of the eggs having been briefly under water during a high tide.

In good circumstances, Bearded Tits may successfully fledge more than ten young per pair in a season, with the most successful pairs perhaps rearing 20. This may be the highest productive rate achieved by any passerine in Europe and clearly represents a fairly extreme life-style. How do they manage it?

To some extent, they live in a suitable habitat for rapid reproduction. The best wetlands are extremely productive, so there is plenty of food. Furthermore, insect abundance in a reed-bed generally rises from April to August (Bibby & Thomas in prep.), unlike that in woodland, for instance, where there may be a rather sharp seasonal peak of abundance of food for most breeding birds. Bearded Tits can therefore produce several large broods in a long season. This is in marked contrast with the most numerous bird in the habitat, the Reed Warbler *Acrocephalus scirpaceus*, which, among similarly sized European warblers, has a low reproductive rate but an exceptional longevity. In the jargon (but useful shorthand if understood) of sociology, the Reed Warbler and the Bearded Tit are at opposite ends of the spectrum of K and r selection for life-strategy. This interesting contrast is outside the scope of the present discussion.

Bearded Tits show several adaptations for rapid breeding. Attempts by individual pairs may overlap considerably. In the most extreme cases that I have seen, the young of one brood were still in the nest at nine days old when the first egg of another clutch was laid about 5m away. Nest-building and the feeding of young thus overlapped while the female was simultaneously accumulating reserves for further eggs and feeding her earlier brood. The overlapping of feeding and building is common and, even with marked birds, is exceptionally confusing in the field. If you have a bird nest-building, you do not expect to find that it also has five-day-old young. Some nests give the impression of having been put together in undue haste, and building of the current nest may continue virtually until hatching time. Building can therefore be taking place at almost any stage of the breeding cycle. The young leave the nest before they are able to fly and appear to be independent of their parents at 20-25 days old. All stages of the breeding cycle are thus compressed and there is considerable overlap in the timing of successive broods. The details would repay further study of a marked and carefully observed population.

I suspect that Bearded Tits also maximise their breeding rate by producing young of comparatively low quality. Fresh eggs weigh about



239. Adult female Bearded Tit *Panurus biarmicus*, with two damselflies, Norfolk, May 1943; note perching position, with feet on separate reed stems (*Eric Hosking*)

2.05g and summer adults about 15.5g. At 13.2% of the female body weight, this is a typically sized egg for a passerine of this size (Lack 1968). The young, however, are rather sparsely feathered (Steiner 1971) and have a complete post-juvenile moult. Late-summer juveniles weigh about 14.0g, with a wide variation, which is light in comparison with the adults. Juvenile Reed Warblers, in contrast, reach adult weight in less than two weeks.

Spitzer (1972) postulated another interesting behaviour related to high reproductive rates, in which early-reared young may themselves breed in August after completing their moult. There is no field evidence for this suggestion apart from the fact that adults are normally moulting at the time of the late breeding attempts. A captive juvenile apparently laid an egg on 21st July after completing an unusually early moult. It would be remarkable if juveniles could be shown to breed in their first autumn. I am not aware of any other temperate-latitude passerine in which juveniles breed at less than six months old; even helping parents to rear their later broods is unusual.

Two studies (Ten Kate 1932; Feindt & Jung 1968) have hinted at polygyny, mainly from evidence of unusually large clutches. It is suggested that these result from two females laying in the same nest. The latter authors also reported a case of a male simultaneously feeding two nests of young about 100m apart. I rather doubt if the Bearded Tit will prove to be regularly polygynous. It is quite the wrong sort of bird. With no defence of food resources or potential nesting places, there is no obvious way for an already mated male to be a better prospect for a female than one who is not mated. The sex ratio is approximately equal, though in small populations there could easily chance to be one or two more females than males. The breeding system is such that males are fully involved, whereas in polygynous species the female has to be able to breed with limited or no assistance from the male. Probably as a consequence of the lack of territoriality and shared sex roles in nesting duties, there is very little sexual dimorphism in body size.

A third possible peculiarity is that Bearded Tits show co-operative breeding. Koenig (1951) reported occasional assistance from a second female in feeding young. Feindt & Jung (1968) observed this regularly, but ascribed it to polygyny with a single nest. They did, however, admit that conclusive evidence would be difficult to acquire. In my limited study, nest visiting by different adults of both sexes and juveniles was frequent, and I never saw it resisted. Nor, though, did I see any of these birds feed the young. We have a bird, therefore, which may show any one of three unusual systems: precocious breeding, or co-operative breeding, or polygyny. The evidence so far is simply insufficient.

From as early as May, parties of juveniles have often gathered in flocks in rich feeding grounds such as along the water's edge, and by mid July the oldest will have started a complete post-juvenile moult. The European passerines which undergo such a moult are a curious collection (Ginn & Melville 1983). The main thing that they appear to have in common is an evolutionary origin in more tropical areas where complete post-juvenile moult appears to be frequent (Fogden 1972). Several studies of the Bearded



240. Two male Bearded Tits *Panurus biarmicus*, Norfolk, September 1978 (J. D. Bakewell) **241.** Adult female Bearded Tit *Panurus biarmicus*, German Federal Republic. May 1965 (Manfred Temme)

Tit moult (Baker *et al.* 1975; Hereward 1976; Spitzer 1972; Pearson 1975) have estimated the duration at about 55-65 days. Later-reared young start at a younger age, which can be recognised by eye-colour (Pearson 1975), and moult rather faster, the quickest perhaps taking as little as 40 days to complete by about mid October. These moult rates are more of the speed found in migratory rather than sedentary passerines; the Long-tailed Tit for instance takes about 80 days (Ginn & Melville 1983).

After completion of the moult, Bearded Tits may begin to show high group flying and emigration in the morning on still autumn days. This behaviour was described in detail by Axell (1966), who recorded that it started on a large and regular scale in 1959, which was a fine summer with high breeding success after a run of years with a steady rise of the British population. Irruptive behaviour is now of regular occurrence at many sites in Britain. Evidence for movements in the previous 150 years was only on a relatively small scale (Axell 1966). It apparently started in the Netherlands in 1965. In this year, the population on the Oost Flevoland polder which was colonised shortly before 1960 had reached an estimated 20,000 individuals. Several thousand were ringed, and produced seven controls in Britain (Hudson 1967): the first direct evidence of overseas movements. A Bearded Tit ringed in Britain in October 1965 returned to the Netherlands, and subsequent ringing evidence has suggested that movements may often be two-way migrations (see Axell 1966; Ball & Smith 1976; Reports on Bird Ringing for 1965 onwards).

Several authors have ascribed these irruptions to population pressures. Autumn numbers of Bearded Tits can indeed be very high after a good breeding season. Whilst high numbers undoubtedly contribute, I agree with Spitzer (1974) that the Bearded Tit's dependence on the seed of a single plant is more likely to be responsible. In a year of poor seed production, irrespective of their population levels, the birds will find themselves without a winter food supply and so must move in advance of starvation. The classic irruptive species, such as the Nutcracker *Nucifraga caryocatactes*, crossbills *Loxia*, the Redpoll and the Siskin *Carduelis spinus*, are also highly dependent on the seeds of single species of plants (Svardson 1957). The reed is a plant whose normal propagation is vegetative, and, in established reed-beds, individual plants (clones) may live for hundreds of years. Reproduction by seed is probably not a major goal in the plant's life strategy and clones are known to be very variable in their seed production (Haslam 1973). There is also considerable annual variation (Haslam 1972). It would be interesting to know the extent to which reed-beds differ in their seed production and thus ability to support high winter numbers and probably better survival of Bearded Tits. The reed-beds of the Dutch polders produced enormous numbers of Bearded Tits and probably contributed to their recent increase in numbers throughout western Europe. Large areas were artificially established from seed, so would have been seed-producing strains of reed. I wonder if this was partly responsible for their favourability to the Bearded Tit? If I am correct that irruptions are more related to seed abundance than to the birds' population levels, then they would not have started suddenly in 1959 as recorded by Axell. I suggest that they did not become obvious until they involved large numbers of birds, but occurred nonetheless. To my mind, Axell (1966) found a lot of old records, considering the scarcity of Bearded Tits and of ornithologists prior to the middle of this century. The Bearded Tit was recognised as being nomadic and migratory in Russia before these aspects received much attention in Europe (Dementiev & Gladkov 1968).

A feature of Bearded Tit movements is the species' tendency to travel in pairs. A male and female caught in Flintshire in October 1965 bore consecutively numbered Dutch rings (Hudson 1967). I caught a similar pair of consecutively ringed Dutch birds from a flock of only five at Grafham Water, Cambridgeshire, in January 1973. This topic was reviewed by van den Elzen (1977b) who gave abundant evidence that the phenomenon is frequent. This, coupled with their tendency to travel in flocks, may be an adaptation for colonising new sites which may be remote and isolated from one another in a desert of unsuitable landscapes. It may also mean that no time need be devoted to pair formation in early spring, so that breeding can begin without delay.

Wintering areas are generally in reeds, but habitat selection is more catholic than in the summer. Some breeding sites, such as Murston in Kent (Ball & Smith 1976), are virtually deserted. Numbers may be substantially reduced in severe winters, but reed panicles are likely to be inaccessible only if glazed with frost or collapsed under exceptional snowfalls. Bearded Tits are not primarily dependent on insects in the winter, so do not



242. Adult male and female Bearded Tits *Panurus biarmicus*, Netherlands, September 1972
(P. Munsterman)

compete with Wrens *Troglodytes troglodytes* and Blue Tits *Parus caeruleus*, which may move into the reeds in large numbers. Blue Tits can extract overwintering insects from the stems of reeds, particularly gall-flies of the family Cecidomyiidae. The crunching of fly-infested reed stems by Blue Tits is a characteristic winter sound of a reed-bed, but Bearded Tits lack the bill power to do this. They do, however, pick over cut stems for overwintering insects, and often follow reed harvesters closely. Grieve (1977) was able to feed Bearded Tits with a seed mixture during severe weather, so their winter survival might be enhanced on nature reserves by feeding during unusually harsh conditions.

Although it is still a scarce bird in Britain, the Bearded Tit is not much of

a problem to nature conservation. Much of its population is now on nature reserves, and, if these are managed to maintain their reeds, they will maintain their Bearded Tits. The population is more widespread than previously, so is less susceptible to reduction by hard winters than when they were confined to chilly East Anglia. The huge numbers in the Flevoland polders were a transient phenomenon, but such large beds may again be created by coastal engineering works. The other very large population, at Lake Tåkern, may be reduced if large-scale commercial harvesting of reeds develops (Bjorkman & Tyrberg 1982). In general, though, reed harvesting and Bearded Tits are not incompatible, and the demand for thatch is a valuable commercial incentive for the maintenance of reed-beds (Bibby & Lunn 1982).

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