

## **An Analysis of the Tay Ringing Group's Chaffinch *Fringilla coelebs* Recoveries.**

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### **Introduction.**

The Chaffinch *Fringilla coelebs* is a common breeding bird in Britain and, although many birds are resident, these are joined in the winter by immigrants from the continent. In addition, some of our breeding birds may move south and west on migration in winter as part of a regular migration strategy or as a response to severe weather, although these movements are generally thought to be rather small and involving relatively few resident birds (Newton, 1967, calculates that 90% of birds move <5km from their natal site). Estimates have been made that approximately 50% of the winter population in some areas are continental birds (Newton, 1972). Although considerable numbers of this species have been ringed and recovered, the proportion of resident and immigrant birds in the winter population is still unclear. There appears to be a difference in the proportion of migrant birds that arrive in different parts of Britain from the continent (Wernham, et al.) and in the behaviour of Chaffinches in different regions (c.f. Newton; Swann). The data set of recoveries from the Tay area gives us an opportunity to compare the behaviour of Chaffinches in this region with the national observations published in the Migration Atlas.

Tay Ringing Group members have caught Chaffinches at finch flock sites and winter feeding stations over the past three decades (e.g. Brockie & Nicoll). Trapping methods have been predominantly mist-netting but also whoosh-netting and a small number of pulli have been ringed. These efforts have generated 89 recoveries reported between 1973-2003. During this same period some 20,000 chaffinches have been ringed by TRG members which gives a recovery rate of less than 0.5%. This compares to the national recovery rate of 0.7% (Wernham et al.). Recoveries are mostly of birds rung in the Tay area but include a small proportion of birds that have been ringed elsewhere and recovered here.

### **Direction of movements**

#### **Juveniles**

A total of 61 immature (Euring age code 3 and 5) birds were recovered of which 50% had moved less than 5km (range 0-825km, mean 30km). Scattergrams were produced to depict the number of birds recovered in each of the eight compass bearings. A scattergram representing direction of travel (fig. 1) for juveniles clearly indicates a high proportion of recoveries to the west and northeast (birds that had moved less than 5km were not included in the scattergram figures to prevent a disproportionate representation of zero degrees). Movements to the northeast were mostly of birds recovered in January-May and recoveries to the west were predominantly from October-April.

#### **Adults**

A total of 28 adult birds (Euring age code 4 and 5) were recovered, of which 64% had moved less than 5km. These recoveries included a female bird ringed in Russia and

recovered at a distance of 2130km in East Fife eight months later. Excluding this movement, the range was 0-130km, mean 9.5km. A scattergram (fig. 2) shows a preponderance of movements to the southwest. Movements in the south to west quarter were reported in September-January.

### Males

A total of 45 male birds were recovered of which 56% had moved less than 5km (range 0-825km, mean 29km). A graph showing direction of travel (fig. 3) shows more recoveries to the northeast and to the west. These movements are mostly recorded in the period January-June.

### Females

A total of 37 female birds were recovered of which 59% moved less than 5km (range 0-264km, mean 19km excluding the Russian bird mentioned previously). Fig 4 shows that most recoveries were recorded to the west. Most of these were also from the January-June period.

Figure 1

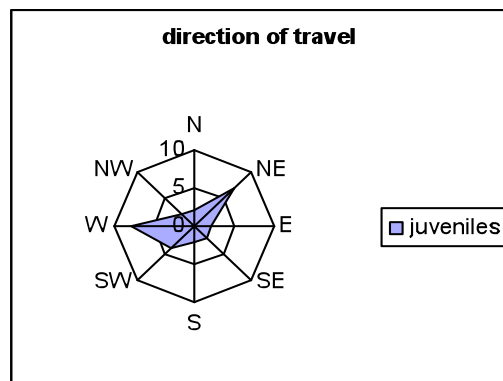


Figure 2

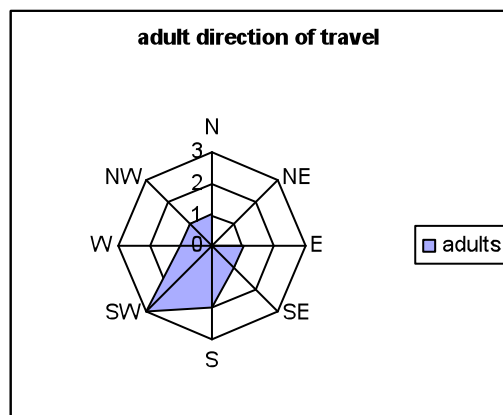


Figure 3

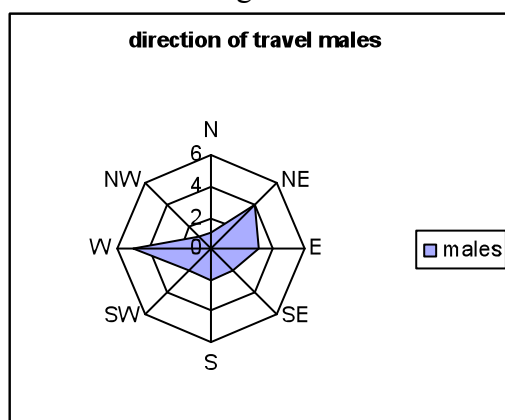
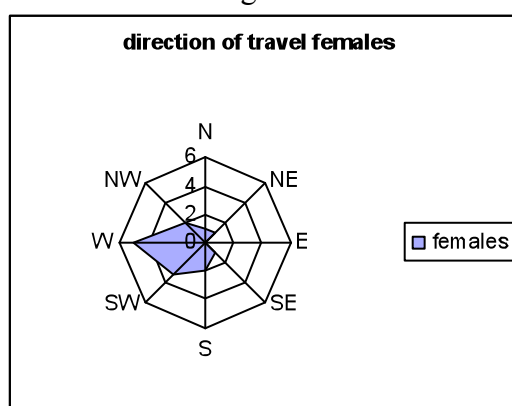


Figure 4



### Seasonal pattern of Recoveries

Recoveries were analysed by sorting recovery dates into four yearly quarters. For convenience, these were labelled as follows.

- Jan-Mar Spring
- Apr-Jun Summer
- Jul-Sept Autumn
- Oct-Dec Winter

It should be born in mind that these divisions are somewhat arbitrary, but they do allow us to broadly examine the patterns of recovery for birds of different age and sex. We would expect birds to be on breeding territory in the summer and for movements away from breeding territories to occur largely in autumn and winter with birds returning to territory in spring. However, there is some considerable overlap in these divisions and birds might, for example, return to breeding territories well into the "summer" period. In addition, the reporting dates of recoveries may not always be correct. These often rely on members of the public reporting finding details accurately. In these cases, dates of finding may refer to birds that have been dead for some time or have been discovered far earlier than the date that was reported.

Daily logs from the Isle of May show that autumn passage occurs from September-November with by far the greatest passage occurring in mid to late October. Spring passage occurs through March to May with most birds seen in April.

Figures 5-8 plot seasonal distribution of recoveries for the data sets of juvenile and adult Chaffinches as well as for male and female birds. These each show lines for two sets of data: one plots all recoveries and the other excludes all recoveries by ringers. Recoveries by ringers are likely to show bias from catching effort, but here the pattern of seasonal distribution is generally similar for most categories. The main exception seems to be that juveniles and males have more chance of being recovered by ringers than one would expect from the corresponding records of dead birds. This may be because juvenile males are somehow easier to catch at this time of year (catching bias). The graphs show that recoveries are highest in the late winter-spring and tail off toward the autumn before beginning to increase in the winter. This follows the pattern that one might expect from food availability and seasonal mortality. The total recovery and non-ringer recovery data probably matches so well because recorded recaptures by ringers is very low. It should also be noted that ringers tend to target birds at baited sites during the same periods that Chaffinches move into garden feeding stations where they are brought into increased contact with cats, traffic and windows and a higher likelihood of reporting by the public.

Figure 5

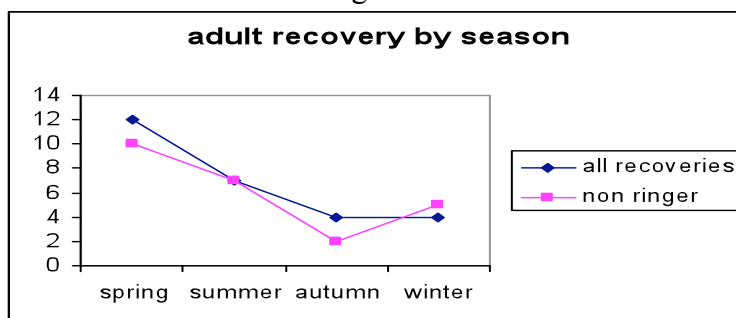


Figure 6

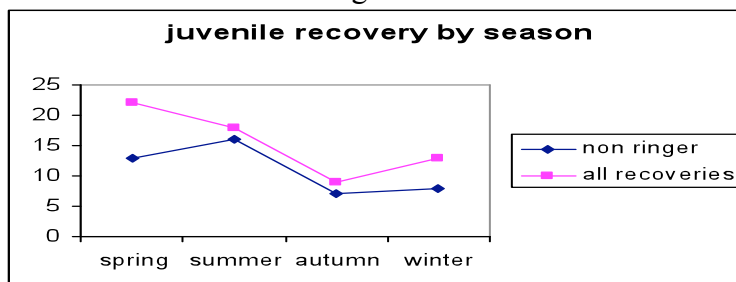


Figure 7

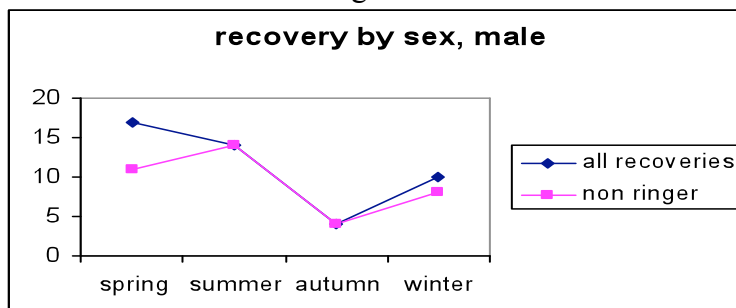
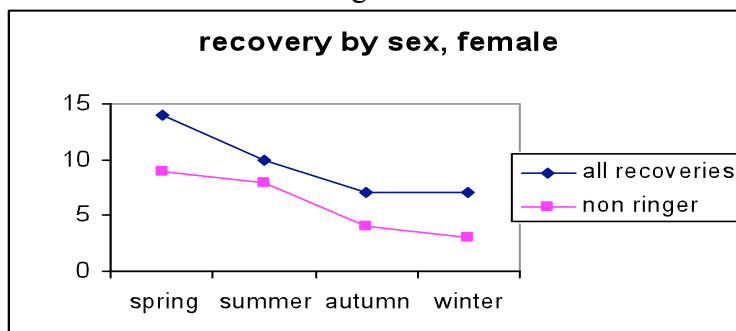


Figure 8



Tables 1 and 2 describe the proportion of male/female and juvenile/adult birds that are recovered during each season for both non-ringer (table 1) and total recoveries (table 2). Note that a very small number of birds were not aged, or were not sexed, but they have been included in the tables and this leads to a small discrepancy in the relative percentages. These figures again show that a higher percentage of males and juveniles are recovered by ringers than one would expect compared with other recovery types. It is tempting to speculate that juvenile males may have a particular trapping bias during the period January-March.

Table 1. Non-ringer

	male	female	total
juvenile	29%	48%	76%
adult	5%	19%	23%
total %	33%	67%	100%

Table 2. Total recoveries

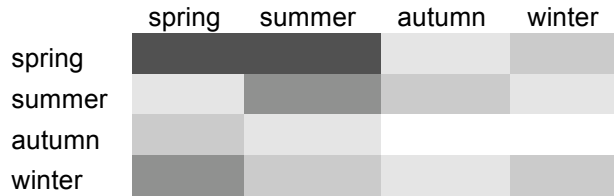
	male	female	total%
juvenile	39%	28%	66%
adult	16%	18%	34%
total %	54%	46%	100%

An analysis of when birds were ringed and recovered (table 3) suggests that those ringed in January-March are the most likely to be recovered and that they, in turn, are most likely to be recovered in the January-July period. Birds caught in October-December are more likely to be recovered in January-March than in the October-December period. There may be a bias towards likelihood of recovery in same or subsequent season because mortality rates will mean that the chance of recovery decreases over time. However, 73% of recoveries are of greater than 9 months. This suggests that birds are more likely to be recovered in the same season as ringing in subsequent years.

Table 3. Season Ringed (vertical) by Season Recovered (horizontal).

These are given as actual numbers recovered and also expressed graphically. They do not include controls/retraps.

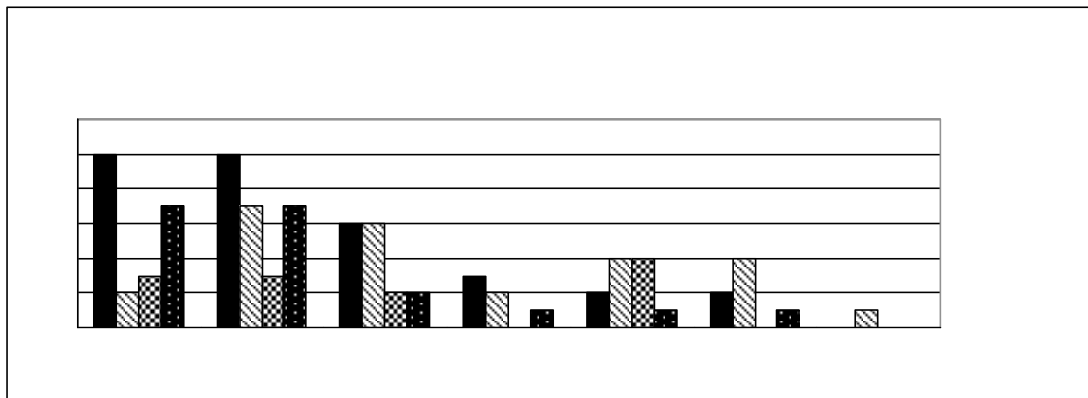
	spring	summer	autumn	winter
spring	8	9	2	4
summer	3	7	5	3
autumn	4	2	0	1
winter	7	5	2	4



### Recovery type

Figure 9 displays the recovery type by age and season. Recoveries by ringers are most common in October-December when capture effort is greatest. Those recorded as found sick/dead/dying show a similar pattern but with high numbers of birds in the summer period too and very few in the autumn. Birds are most likely to die in collision with windows or be captured and released (usually either stunned from a window-strike or caught in a building) in the spring and summer but are more likely to collide with a car or be captured by a cat or predator in the summer-autumn. (The two most unusual causes of death recorded were single records of “collision with wires” and “shot”. These were not included in the graph.)

Figure 9.



The recoveries were examined to see if there were any differences between ages or sexes. Males were more likely to be recovered by all categories except for capture by ringers (Fig. 10). Juveniles were far more likely than adults to be recovered by ringers and all other recovery types except for cats and cars (Fig. 11). This may be because the proportion of juveniles is far higher than adults in autumn and winter but is similar in spring and summer when these forms of mortality are most commonly recorded.

Figure 10

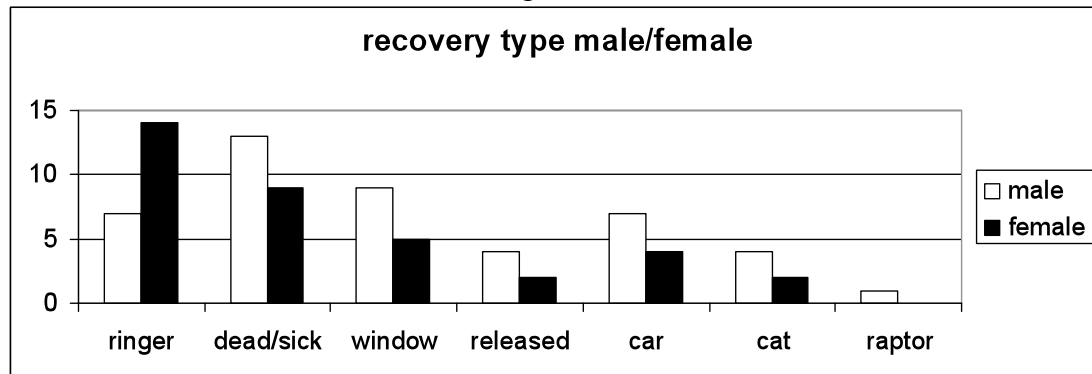
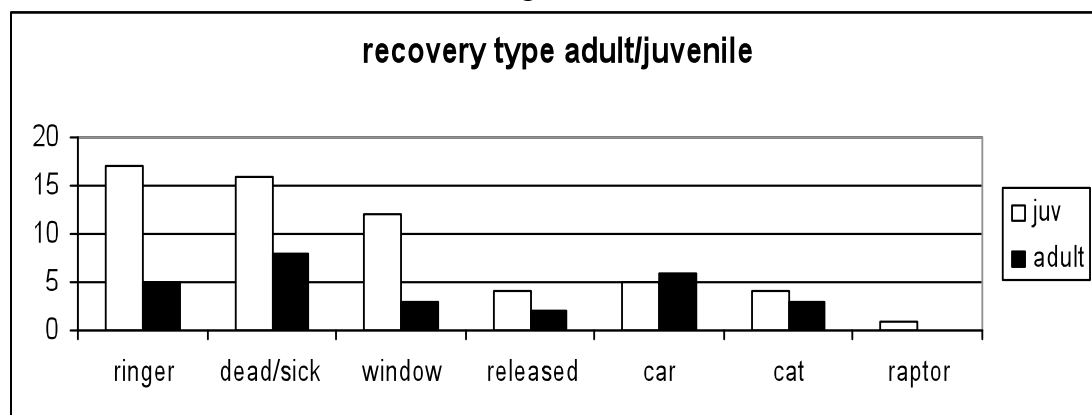


Figure 11



A comparison of recovery types of Tay Chaffinches (table 4) with the national averages as published in the Migration Atlas suggests that our birds are more likely to be recovered through human related incidents but less likely to be taken by domestic predators. A larger proportion of our birds are recovered by ringers (recaptured) and this reduces the proportion of birds recovered dead. This may be due to the lower human population in our area compared to England where proportionally more Chaffinches may be ringed in gardens.

Table 4

	TAY	BTO		TAY	BTO
human related	79%	55%	dead	75%	86%
domestic predator	16%	22%	(known cause)	47%	59%
deliberately taken by man	3%	8%	recaptured	28%	14%
other	3%	15%	resighted	0%	<1%

## Discussion

The analysis of the TRG recoveries allows us to examine the migration behaviour and survival of our local birds. Comparison of movements suggests that juveniles and females in the Tay area are involved in migration movements more than adults and

males. For juveniles, there is a distinct movement northeast, particularly in spring, and west (with a component southwest) through the winter. In adults we see no northeast movement, but a distinct winter movement southwest, while males display a northeast movement (again mostly in spring) and a strong westerly movement, - also in spring. However, females (like adults) show virtually no movement to the northeast but a strong movement to the west (with a significant component to the southwest as well) in the spring period.

It may be that the northeast and due west component of movements that we see, especially in juvenile males, (we have no records of adults to the northeast) is associated with the movement of continental migrants. This would fit with the larger movements we record for male and juvenile Chaffinches and the seasonal pattern of recoveries suggest that these birds are passing through our region quite quickly in the winter and returning northeast along the Scottish coast rather more slowly in the spring. This would fit the pattern of movements noted by Newton(1972) and discussed in the Migration Atlas.

In comparison, it seems that there is a west to southwest movement of birds in late winter/early spring which may comprise mostly of adult females (orientated predominantly to the south and southwest) and juvenile females (mostly west to southwest). There is a difference in orientation and range of movements which suggests that we may be seeing a movement of juvenile females from our breeding population to milder conditions in the west along the same route as continental birds. Adults, and especially adult males, move far shorter distances, on average, and these movements are orientated to the south and southwest in the winter rather than spring period. These movements are probably more closely associated with cold-weather conditions and it seems that adult birds are more likely to stay on, or near their territories, especially as spring progresses.

We have noted a possible trapping bias for juvenile males (they are more likely to be retrapped by ringers in spring than the other age/sex classes) and this may be the result of their greater mobility at this time of year. It seems that they are more likely to move between ringing sites.

The Migration Atlas concludes that there are regional differences in migration strategies of British Chaffinches: The median distance of recovery for birds ringed in May-July as a whole is <1km but in the Tay area this is 3km (n=14). These figures suggest that our resident birds are more mobile than the national average.

The analysis of the Tay RG recoveries suggests that there are differences in movements between the various age/sex categories and that the vast majority of immigrant birds we see here are juvenile males. There are also strong indications that Chaffinches in the Tay area have different patterns of movement to birds from further south. These recovery details may assist in further studies of the flocking, dispersal and migration behaviour of this species.

### **Acknowledgements**

Thanks to Steve Moyes who first enthused me with the joys of finch ringing. Thanks are due to all the ringers in Tay RG, and further afield, who helped in catching Chaffinches over the past four decades, and also to all those members of the public



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