Bird protection in the State Research Station for fruit growing Heuchlingen

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Abstract

Over the past few years up to 62 nesting boxes for birds have been provided in the 35-hectares area of the State Research Station for fruit growing Heuchlingen(State Institute for Viticulture, Oenology and Fruit Technology Weinsberg (LVWO)) in order to support several species of birds, especially cave breeders. Four species were found breeding in the one-hectare organically managed fruit orchard with six nesting boxes: Tree Sparrow Passer montanus L.*, Great Tit* Parus major L.*, Common Redstart* Phoenicurus phoenicurus L. *and Black Redstart* Phoenicurus ochruros Gmel.

The Tree Sparrow with a number of seven breeding pairs and 30 fully-fledged nestlings was dominating in 2011. In 2005, during a period of mass propagation of winter moth Operophthera brumata L. *the clutches of Blue Tits* Parus caeruleus L. *and Great Tits were clearly larger than the year before due to the food quantity. In addition to the songbirds, the Kestrel* Falco tinnunculus L.*, a falcon that hunts mice, was supported by a nesting box installed at the fruit storage building. It was breeding successfully the third time since 2007.*

The Common Buzzard Buteo buteo L.*, another raptor has frequently been breeding in a walnut tree. During the bird's breeding period the use of heavy machinery around the nesting area was stopped in order to avoid disturbance of the brood.*

Keywords: bird protection, fruit orchard, nesting box, Blue Tit, Tree Sparrow

Introduction

Several species of birds are very useful for the control of pests in addition to predatory mites and beneficial insects in orchards. Some birds depend nearly exclusively on aphids, caterpillars and mice. Thus, birds also preserve and – moreover - increase biodiversity and contribute to stabilize the agrarian ecosystem of a fruit orchard – just being present is a guarantee for the aforementioned. Some species of birds do not build nests themselves, but they are dependent on natural brood-caves (e.g. woodpecker cavities) in older high stem trees and some of them take over old nests from other birds. In the modern and intensively managed fruit orchards with small-crowned trees, characterised by slower growth, natural brood-caves do not exist. It is therefore necessary to provide artificial nesting boxes made of natural wood concrete (cement-bonded wood) for example, attached high up in a canopy or installed on posts or premises (farm buildings). By these means (or methods) various species of cave breeding birds can be located effectively in fruit orchards.

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Material and Methods

Some years ago more than 60 nesting boxes have been installed in the orchards as well as in some buildings of the State Research Station for fruit growing Heuchlingen, six of them in the one-hectare organically managed fruit orchard. With diameters of 45, 32 or 26-27 millimetres and vertically oval in shape according to the requirements of each bird species, the entrance holes of the nesting boxes should be adjusted to southeast or south to catch the warm rays of the morning sun (Henze, 1991). They should not be adjusted westwards as the holes should not be exposed to direct rainfall. Furthermore, it is advisable not to adjust the entrance hole towards the tram line to avoid the spray dust while carrying out sprayings for plant protection measures. For a more effective monitoring and easier handling and cleaning, nesting boxes were hung at eye level on trees or posts. They were always thoroughly cleaned with a brush and any old nest were removed prior of the next breeding season. During the breeding periods the nesting boxes were monitored three times from May to July in regular intervals. Thereby the data and observations (i.e. number of eggs, nestlings, species) were noted.

Results

1. Songbirds

The fouryears monitoring results (2008 to 2011) of the six nesting boxes of the organically managed fruit orchard of the Research Station for fruit growing in Heuchlingen are listed in table 1. Four species of breeding birds, namely Tree Sparrow, Great Tit, Common Redstart and Black Redstart were found more often. Nowadays, in 2011, the Tree Sparrow dominates with a number of seven successful broods and 30 fledglings. In 2010, two pairs of birds in two nesting boxes had two successful broods immediately one after the other. In former times the Tree Sparrow was regarded as a harmful species and was under severe pressure from hunting because it also feeds the buds and seeds of plants. However, during a long breeding season the sparrows feed lots of protein-rich food such as caterpillars and aphids from April to August. Over the last few years the population of the Tree Sparrows has been strongly decreasing and, as a result, it was set on the Red List of Threatened Species (Bauer, 2007).

Table 1: Results of the nesting box monitoring of six nesting boxes in the organically managed fruit orchard of the Research Station for fruit growing Heuchlingen (2008-2011)

Species	N (2008)		N (2009)		N (2010)		N (2011)	
	broods	nest-lings	broods	nest-lings	broods	nest-lings	broods	nest-lings
Tree Sparrow	3	15	2	10	6	16	7	30
Great Tit			1	5	1	5		
Common Redstart	1	3	2	8				
Black Redstart	1	5	1	3				

In 2011, the overall result of 328 fledglings of five different species of birds (Tree Sparrow, Great Tit, Blue Tit, Common Redstart and Common Starling *Sturnus vulgaris* L.) was proceeded by 61 successful broods taking place in 62 nesting boxes on the 35-hectares area Research Station for fruit growing Heuchlingen.

In 2005, the mass propagation of the winter moth reached its peak in the area. In June, untreated sweet cherry trees suffered from a total defoliation as a result of the caterpillars' feeding activity. The caterpillars of the winter moth did not even spurn walnut leaves.

Table 2: Results of the nesting box controls in the Research Station for fruit growing Heuchlingen (2004 and 2005)

Species	N (2004)			N (2005)		
	broods	nestlings	nestl./brood	broods	nestlings	nestl./brood
Tree Sparrow	10	41	4.1	15	55	3.7
Great Tit	13	80	6.2	7	58	**8.3**
Blue Tit	3	20	6.7	3	29	**9.7**
Common Redstart	4	20	5.0	2	9	4.5

Three breeding pairs of the Blue Tit show a significant increase of nest-size from 2004 to 2005 (table 2). The average number of 6.7 fledglings in 2005 increased to 9.7 individuals per brood in 2005. According to personal observations, the main food source were caterpillars of the winter moth, that had been fed to the juveniles in the nesting boxes in intervals of 30 sec.. Low competitive species like the Small Blue Tit needs nesting boxes with a single (selective) entrance hole of 26 - 27 millimetres. This species was observed regularly in the same area with three to four broods/year.
In 2005, the clutches of the Great Tits were significant larger than 2004, probably due to the quantity of food. Taking the number of broods into consideration we can clearly see the competitive strength of the Tree Sparrow. Both of the two species breed in nesting boxes with an entrance hole of 32 millimetres in diameter. As Tree Sparrows start earlier into the breeding season, their first nest was not synchronized with the winter mothspopulation peak – this was reflected by the clutch size found for this species. A similar situation occurred to the Common Redstart. As a migratory bird it starts breeding not earlier than May, appr. at a period of time, when the winter moth caterpillars start to pupate.

2. Raptors

Likewise the cave breeders among the songbirds, falcons and owls do not build nests by themselves. They breed in old nests of raptors and crows as well as in wall niches of buildings. The Common Kestrel is known as a raptor keen on catching mice. By increasing nesting opportunities for kestrels it is proposed to provide special nesting boxes: large-scaled and with a semi-open front side. In 2007, a nesting box for kestrels was installed at the east side of the fruit storage building Station in Heuchlingen, mounted at a height of appr. five metres. It was well accepted by the birds and the kestrels have successfully bred three times.
The Common Buzzard also feeds on mice. It is a shy raptor and it builds large and stable nests consisting of twigs and branches in canopies of higher trees. Almost every year during the observations, it bred in a walnut tree at the area of the Research Station. To ensure an undisturbed breeding and rearing the nestlings, the use of disturbing machinery around the nesting site was not allowed.

Discussion

By means of nesting boxes various songbirds such as Tree Sparrows, Great Tits, Blue Tits and Common Redstarts could be settled in orchards, intensely used for organic and integrated fruit growing of the Research Station for fruit growing Heuchlingen. The birds support fruit farmers in regulating pests. The Kestrel, a successful mouser breeds in a special nesting box at the fruit storage building, the Common Buzzard in a walnut tree. In 2004 and 2005, observations on Great Tits and Blue Tits showed an increase of the offspring due to a large food supply of caterpillars of the winter moth. Currently farmland birds are declining severely (Sudfeldt *et al*., 2009). Furthermore, in addition to supporting cave-dwelling species of birds, it is recommended to improve nesting and food conditions for birds building nests by themselves and for populations breeding in open spaces as well, such as Yellowhammer *Emberiza citrinella* L., European Goldfinch *Carduelis carduelis* L., European Serin *Serinus serinus* L., Red-backed Shrike *Lanius collurio* L. and others. This can be achieved by various means, for example by planting fruit-bearing shrubs and hedges (but no host plants for fire blight), by sowing wildflowers, by stone heaps and heaps of twigs and branches. Quite a number of beneficial insects are able to benefit from these measures.

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