FORAGING ASSEMBLAGES OF BIRDS IN DIFFERENT OLIVE PLANTATIONS DURING THE SECOND HALF OF MARCH

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Overall, 40 bird species were recorded along 17 transects in three types of olive plantations. 27 species belong to the breeding though we could still record 4 wintering species, 9 more species used the olive plantations as a stopover site. Regarding foraging guilds, were distinguished 7 different groups. Granivorous birds (7 species), were the most abundant and frequent, specially Serinus serinus, and they were specially abundant in orchards with an abundant herbaceous cover (mean cover 25.3%). Nine species were classified as foliage gleaners insectivorous, and they occurred mainly in the old and deserted olive orchards. Seven ground foraging insectivorous species, six aerial insectivorous, two frugivorous birds and ground foraging omnivorous and zoophagous species make the rest of the foraging guilds.

Key words: ornithocoenoses, olives, foraging strategy, migration

Introduction

Single-crop farming usually provides a low food supply, especially for insectivorous birds. The intense management (frequent spraying, pruning, mowing, etc.) to increase productivity of single-crop farming results in poor foraging webs, in comparison to traditional and less intensive farming styles. For this reason ecologists paid only few attention to this relatively simple ecosystem. However, because of the simplicity, single crop farming can be a good model system to investigate the role of different factors, e.g. on animal diversity.

Olive plantations may be a good example for a simple structured ecosystem due to very intensive agricultural management. They consist of regularly distributed, usually low trees (two to three meters in height) with almost no herb layer. Olive tree plantations (Olea europaea, var. europeae) make up a large part of S Spain and many central- and north-european bird species migrate or overwinter there (Muñoz-Cobo 1987, Rey 1993, Muñoz-Cobo & Purroy 1980). Since olive fruits are actually an important food for many of them (Jordano & Herrera 1981, Herrera 1984, Jordano 1988, Rey 1995) olive plantations may somehow compensate for the loss of original mediterranean shrubs and wild olive scrublands.

There are several studies investigating bird communities in olive plantations (Muñoz-Cobo 1987, 1992, Rey 1992, 1993, 1995, Rey & Valera 1999, Valera 1992) and also papers
dealing with food of frugivorous birds (Herrera 1984, Jordano 1987, Rey 1995). Rey (1993) also compared the structure of olive tree habitats (from wild olive shrublands to cultivated olive plantations) in relation to frugivory during winter time. Relatively few is known about insectivorous birds and their ecology in these habitats. In this study we aim to describe the bird community of olive plantations at the onset of breeding i) in relation to the foraging, breeding and migrating status and ii) in relation to different types of olive habitats.

Material and Methods

Study area

The study was carried out in SE Spain, Jaén province (37° 52' N, 3° 55'S). The selected sites were located between 550-700 m a.s.l. (localities: Torre delcampo and Jaén, Jaén province). Birds were censused along transects (1000 m long, 25 m on each side) in three different types of olive plantations:

a/ old cultivated plantations - olive trees more than 80 years old. Weed cover (Diploptaxis sp., Calendula arvensis, Erodium spp., Lolium sp., Fumaria sp., etc.) varied between 12 to 42%. Distance between trees was 10 x 12 m and more than 90% of the trees were higher than 3.5 m, with two or three trunks (diameter in one meter height: 30-50 cm). Eight transects were done near Torre delcampo.

b/ young cultivated plantations - olive trees less than 10 years old. Weed cover (same species as above) varied between 3 to 9.5%. Tree distance was 6 x 6 m and most of the trees (ca. 90%) were between 1.8 and 2.5 m high with only one trunk (diameter in 1 m height is 10 to 15 cm). Seven transects were done near Jaén.

c/ old uncultivated plantations - olive trees older than 80 years but uncultivated for at least 10 years. Distance between trees was 10 x 12 m and more than 90% of the trees were higher than 3.5 m, with one trunk (diameter in one meter height: 30-50 cm). Ground cover is 100 % and consists of herbs and shrubs (Thymus sp., Lavandula sp., Rosmarinus officinalis, etc.). Two transects were done near Jaén.

Data collection

The birds were recorded using a transect sampling method. One transect lasted for one hour and transects were done during the morning hours (between 7h30 to 11h30). All birds sighted (singing, calling or foraging), weed cover and tree age were recorded for each 100 m.

Censuses were carried out from 15 to 28 of March, 1999, at the onset of the breeding period. Therefore, some birds already started breeding (Serinus serinus, Acantis canabina, Chloris chloris, Carduelis carduelis, Lanius meridionalis), some did just arrive from the winter quarters (Hirundo daurica, H. rustica, Oenanthe hispanica, Merops apiaster, Neophron percnopterus), and some birds were wintering or migrating (Phylloscopus collybious, Sylvia atricapilla, Turdus philomelos, Emberiza citrinella, Table 1)

In relation to foraging behaviour all birds were classified into seven foraging guilds: GG - ground foraging granivorous, Fl - foliage gleaner insectivorous, FF - frugivorous, GI - ground foraging insectivorous, GO - ground foraging omnivorous, Z - zoophagous, A - aerial insectivorous - (see Table 1). This classification was done using visual observations of foraging birds along transects. Most bird species were assigned to one of the above mentioned categories according to the predominant use of a specific foraging method (more than 50% of the time during specific one-hour time sampling). Our observations were complemented with literature data (e.g. Sylvia spp., Neophron percnopterus).

Results

Overall, we recorded 40 bird species during our 17 transects in these three types of olive plantations (Table 1). Our picture of the bird assemblage inhabiting the olive orchards during this time shows that most birds (27 species) belong to the breeding community though we could still record 4 wintering species. During our censuses we also registered 9 more species, which used the olive plantations as a stopover site during migration, for foraging or roosting (Table 1).

Most of the breeding birds used the tree layer for nesting. In fact, the most frequent and abundant breeding bird species belong to the family Fringillidae: Serinus serinus, Carduelis carduelis, Carduelis chloris, Acanthis cannabina and Fringilla coelebs account for most of the birds registered during our censuses. This is specially the case in our mature, intensely cultivated orchards. In contrast, ground nesters (Galeria cristata, Aleotoris rufa, Burhinus oedicnemus, Oenanthe hispanica) were more abundant in young olive plantations (Table 1). Wintering birds like Sylvia atricapilla and Turdus philomelos and birds nesting in the scrub and/or herbaceous layer (Sylvia undata, Sylvia melanocephala) were more common in the scarcely managed orchards (see Table 1). Mature trees also offer suitable possibilities for cavity nesting species, like Parus major, Certhia brachyactyla, Upupa epops.

Some species included in the breeding community are more related to human settlements than to the olive orchards (e.g. Phoenicurus ochruros, Hirundo rustica, H. daurica, Falco tinnunculus).

Regarding foraging guilds, we could distinguish 7 different groups (Table 1). Granivorous birds, including 7 species, were the most abundant and frequent, specially Serinus serinus, and they were specially abundant in orchards with an abundant herbaceous cover (12-42%, mean 25.3%). Nine species were classified as foliage gleaning insectivorous (Sylviidae, Certhia brachyactyla, Parus major), and they occurred mainly in the old and deserted olive orchard which held a high abundance of insects both in the olive trunks, non sprayed canopy and in the permanent herbaceous layer. Seven ground foraging insectivorous species were represented mainly by Upupa epops and Galeria cristata. Six aerial insectivorous species are mostly visitors from neighbouring habitats (Apus spp.) or human settlements into the plantations (Hirundo spp.). Two frugivorous birds (Turdus spp.) were dependent mostly on the last remaining ripe olive fruits. Ground foraging omnivorous and zoophagous species make the rest of the foraging guilds.

<table>
<thead>
<tr>
<th>Species Name</th>
<th>C &gt; 80 n=8</th>
<th>C &lt; 10 n=7</th>
<th>UC &gt; 80 n=2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merops apiaster</td>
<td>A M</td>
<td>12.5 0.4</td>
<td>0 0</td>
</tr>
<tr>
<td>Pyrrhocorixa rubra</td>
<td>A R</td>
<td>0 0</td>
<td>14.3 3.0</td>
</tr>
<tr>
<td>Apus apus</td>
<td>A M</td>
<td>12.5 0.1</td>
<td>0 0</td>
</tr>
<tr>
<td>Apus pallidus</td>
<td>A M</td>
<td>0 0</td>
<td>14.3 1.5</td>
</tr>
<tr>
<td>Petronia petronia</td>
<td>GO R</td>
<td>0 0</td>
<td>0 0</td>
</tr>
<tr>
<td>Monticola saxatilis</td>
<td>GI M</td>
<td>0 0</td>
<td>0 0</td>
</tr>
<tr>
<td>Corvus corax</td>
<td>GO R</td>
<td>12.5 0.3</td>
<td>14.3 2.2</td>
</tr>
<tr>
<td>Neophron percnopterus</td>
<td>GO M</td>
<td>0 0</td>
<td>14.3 0.7</td>
</tr>
</tbody>
</table>

Total species 40 28 24 19
Breeding species 27 19 14 11

Discussion

This study shows that many bird species can be found in olive plantations during this time of the season. However, it must be noticed that at this time we recorded breeding birds as well as some migrants and the last wintering birds. If we focus on the breeding assemblage the number of species decreases considerably and this is even more the case when we focus on a specific olive plantation. In fact, the breeding bird community of the olive plantations is poor (Muñoz-Cobo 1987, 1992, Valera 1992). However, it should be stressed that there are many types of olive orchards and that bird communities vary widely according to the characteristics of the orchard. Breeding birds select their habitat on the basis of two main factors: suitable nesting places and food availability (Wiens 1989). Habitat structure is a major factor influencing the structure and composition of the community. Our results show that young olive plantations, with more open ground, hold birds typical of steppes whereas in mature orchards finches and other woodland species are more dominant (Muñoz-Cobo 1987, 1992, Valera 1992).

The next step influencing the structure and composition of the bird community is the type and abundance of food. Differences in the bird assemblages of our two mature orchards are given by the management of the herbaceous layer. Highly managed orchards usually have many weeds at the beginning of the breeding season (unless sprayed with pesticides) and thus, granivorous birds are abundant. In fact, abundance of some granivorous birds, like Serinus serinus, is correlated to the abundance of some weeds (Diplolatazis and Erodium spp.) which make the basis of its food (Valera 1992, Valera et al. 1997). Deserted or scarcely managed orchards favour species breeding in dense basal layer (herbaceous or scrub-like) and insectivorous and frugivorous birds. In fact, the occurrence of some fruiting plant species apart from the olive tree increases the number and abundance of frugivorous, wintering bird species (Rey 1995), as is reflected in the high numbers of Song Thrushes and Blackcaps (which at this time frequently feed on olive fruits, see Jardina & Herrera 1981, Rey 1995) found in the deserted orchards.

Olive plantations play an important role in the wintering of frugivorous birds in the mediterranean area. They hold high densities of Blackcaps and Song Thrushes (Rey 1993)
though diversity of frugivorous birds is poor in comparison to natural habitats. During the breeding season olive orchards are also a suitable habitat for some species, mainly finches, but the occurrence and abundance of other breeding bird species is low. An increase in the structural complexity and the richness of plant species in the orchards would increase the attractiveness of this habitat for breeding and wintering birds. Unfortunately the actual trend is a simplification and homogenization of this monoculture at a large scale.

References


POTRÁVNÉ ZOSKUPENÍA VTÁKOV
RŮZNYCH OLIVOVOÝCH SADOV V DRUHEJ POLOVICI MARCA
Sührn

V marci 1999 (15–28.), tj. začiatkom hniezdné sezóny včišťiny druhov boli študovali potravné zoskupenia vtákov v troch typoch olivoňových sadov okolia Jaénu v JV Španielsku (550–700 m n.m.). Sezóna bola oneskorená opôri priemerným rokom o 2 týždne a tak len prvé druhy začínali hniezdiť (Serinus, Acanthis, Chloris, Carduelis, Lanius meridionalis), iné práve prichádzali zo zimovisk (Hirundo daurica, H. rustica, Oenanthe hispanica, Merops apiaster, Neophron percnopterus) a niektoré ešte stále zimovali (Phylloscopus collybita, Sylvia atricapilla, Turdus philomelos, Emberiza citrinella, Table 1).

V troch olivoňových sadov (starych >80 ročných obhospodarovaných, mladých <10 ročných obhospodarovaných, a starych >80 ročných obhospodarovaných) sme na 17 transektach (1000 x 50m) zistili spolu 40 druhov vtákov, z toho 27 hniezdicov, 4 zimujúce druhy a 9 druhov, ktoré v sadoch transmigrovali, zberali potravu, resp. odpočívali. 22 druhov hniezdi priamo v olivoňových sadoch, z toho 14 na stromoch, 4 na zemi (Galerida cristata, Alectoris rufa, Burhinus oedicnemus, Oenanthe hispanica), 4 v bylinne, príp. krovinovej etáži (Sylvia undata, S. conspicillata, S. horultana, Troglydotes troglodytes) a zvyšných 5 v blízkych domkoch a hospodárskej budowách v sadoch (Phoenicurus ochruros, Passer domesticus, Hirundo rustica, H. daurica, Falco tinnunculus – Tab. 1.) Zaujímavé je, že až 26 druhov je tam stálych (65% zo zistených), 10 migruje (25%) a 4 zimovalo (10%). K najcastejším a najpočetnejším vo všetkých sadoch patril Serinus serinus, menej Carduelis chiloris a Fringilla coelebs, z migrujúcich a zimujúcich druhov Sylvia atricapilla a Turdus philomelos. Obe skupiny starych sadov (obhospodarované i neobhospodarované) poskytujú dostatok hniezdnych dútín aj pre insektivory (Parus major, Certhia brachydactyla, Upupa epops, Athene noctua). V mladších sadoch sa odkryvali, intenzívne oranou pôdou a redšimi korunami než v hniezdnych sadoch, hniezdia početnejšie hniezdičie na zemi a druhy vziazené potravou na hmyz odkrytej pôdy – Galerida cristata, Alectoris rufa, Burhinus oedicnemus, ale aj Lanius meridionalis.

V opustených sadoch značne ovplyvnených sukcesiou a zarastaniem nerudennou bylinou a krovinou vegetáciou patril k charakteristickým druhom hniezdícich insektivorov druhu Sylvia undata a S. melanocophala. Vtáky študovaných sadov patria do 7 potravných gild. Najpočetnejšie a najčastejšie zistujúce granívory zbierajúce potravu zo zeme (7 druhov, najpočetnejšie Serinus serinus) a vyskytovali sa najmä v menej kosených a oraných starych alebo obhospodarovaných sadoch (pokryvnosť burín 12–42%, priem. 25,3 %) s dostatkom životiníkmi druhov Diplomatus sp., ktorých semen a puky sú ich najdôležitejšou potravou. 9 druhov bolo zaradených ako listové insektivory (napr. Sylviidae, Certhia brachydactyla, Parus major) a vyskytovali sa najmä vo starych a opustených sadoch s vyššou diverzitou hmyzu. Dva frugivory (Turdus spp.) boli zvislé najmä na zvyšku prezretých olivoňových plodov a neskôr budú iste zaradené k ďalším 7 omnivórskym druhom zbierajúcim potravu na zemi ako Alectoris rufa, Sturnus vulgaris, atď. 7 druhov zaradených ako insektivory zbierajúce potravu na zemi patrila najmä druhy Upupa epops a Galerida cristata. Dva zoštátnene druhu (Athene noctua a Falco tinnunculus) sú však eurytopné a zvislé na prítomnosti solitérne stojacích domov a posesov. 6 vzužaných insektivori vo pochádzajú najmä z okolitých habitatov (Hirundo sp., z domov, Apus sp., Pyonopponge sp. zo skál). Ďalšie druhy sú len vzácnejší hostia, vyskytujú sa v sadoch počas fahu, alebo pochádzajú zo susedných habitatov (potokov, mokrád, xerotermov).