PRELIMINARY CONSIDERATIONS CONCERNING FOOD DISPONIBILITIES AND FEEDING BEHAVIOUR OF REED PASERINES

BY

CONSTANTIN ION1 AND OVIDIU POPOVICI1

Key words: reed paserine; diet; feeding behaviour

The present study aimed at listing aquatic birdforms and their food as well as their behaviour concerning the use of trophic reserves in two periods of time: July 15 – 27, 2003 - the reproduction period of warblers and September 11 – 13, 2003 - the migration period at Iezar- Dorohoi (47° 68’ N/ 26° 23’ E). The types of the Acrocephalus species bearing distinct ecological requirements used the same habitats for finding food. During the reproduction period, the challenge for gaining the food variety is to be noticed only among the specimens of the same species. During fall (migration), the challenge among the different types of warblers and the one among the specimens are very moderate. The seasonal dynamics and the daily dynamics of the reed arthropods are acutely significant in ensuring the food reserves for the Acrocephalus species and in decreasing the competition among them. Another element of great importance is represented by the weather conditions. It was observed that the activity performed by warblers and the competition for food is more intense after rain, wind and low temperatures.

Introduction
Diet represents an important element in ensuring the birds’ cycle of life. The abundance and diversity of food, as well as the seasonal changes within an ecosystem most often interrelate both with the number of bird species and also with the number of specimens. The consistency and the characteristics of food are vital for the formation of energetic reserves, highly necessary to determine the biological rhythm of each specimen.

The existence of food diversity within an ecosystem will lead to a large diversity of species, where they can establish nesting spots or spots where they can halt when migrating.

The research done by us consists mainly in listing the reed paserine in a wet Moldavian area, as well as exploring its existing food accessibility. Aquatic birdforms which make nests and search for food, as listed by us, belong to the type called
Acrocephalus (the Sylviidae family). The arthropods, and especially insects, are their favorite food. During the pre-reproductive periods of chick care and the pre-migration, aquatic birdforms compete among each other about the use of the food availability, and consequently, they are forced to take advantage of various feeding niche. (Bolshakov, Casimir, 2000)

The Acrocephalus species that we had under observation have different ecological needs during the reproduction period, and during the migration period they use the same habitats. (Chernetsov Nikita, 999, a)

Materials and Methods
The present study aimed at listing aquatic birdforms and their food as well as their behaviour concerning the use of trophic reserves in two periods of time:
- July 15 – 27, 2003  - the reproduction period of warblers
- September 11 – 13, 2003  - the migration period

Several trips were carried out to the accumulation lake Iezar, at 1 km Northern distance from Dorohoi (the district of Botoșani) on the valley of Jijia. Iezar Dorohoi has a 640 ha surface and its geographical location is 47° 68’ N/ 26° 23’ E. (Guxtíc O, 1982).

There is typically aquatic and paludal vegetation in this area, suitable for the existence of several rich trophic reserves. The now existing phytocoenoses belong to the following vegetal associations: Glicerietum maximae, Lemnetum trisulcae, Caricetum acutiformis- ripariae, Eleocharitetum palustris, Bolboschoenetum maritimii, Festucetum arundinaceae, Typhetum angustifoliius. (Guxtíc O, 1982).

The pool borders are all covered with phytocoenoses belonging to the Phragmitetum australis association, and which head towards the center and extend over larger and larger surfaces.

The potential draining of the lake led to the setting up of a border vegetation comprising: Ranunculus pedatus, Carex vulpina, Equisetum fluviatile, Lemna minor, Typha angustifolia, Phragmites communis, Mentha longifolia.

Different aquatic birdforms were captured with the help of ornithological nets. These nets are 24 meter long and 2 meter high and were set in the flooded reeds on the pool borders.

In the first stage of the observations, during the reproduction period, the typically birdform abundance was also established by means of the acoustic method of observing, highlighting, according to their singing, the number of breeding pairs and their corresponding species.

The feeding behavior of warblers was analyzed using the visual transectal method and also through direct observations from fixed points.

In the ornithological nets the following specimens were caught: Acrocephalus arundinaceus, Acrocephalus schoenobaenus, and Acrocephalus scirpaceus, and one single exemplary of Locustella fluviatilis (on the 27th of August 2003).
Similarly, our research took into consideration the biodiversity of arthropod communities in the studied ecosystem in order to view the food availability highly necessary for the aquatic birdforms.

Moreover, several data collections’ were conducted using the entomological net. The collections were completed at the limit point between the reed located on the lake and the plant vegetation on the border, in the meadows surrounding the water luster and also under the reed surface.

During the first period of observations, we put together an important amount of samples, which were collected during the three daytime moments (in the early hours of the morning, at noon, and in the evening) with the purpose of grasping any change in the structure of arthropod communities in the course of a whole day.

One piece of evidence was provided by the captured arthropods in the entomological nets after 50 sweeping through the vegetation. The arthropods seized this way were introduced in plastic bags, preserved in 80% alcohol and afterwards analyzed in laboratory. The evidence finally came out in a total amount of 564 arthropods.

Results and discussions

The diversity and the abundance of aquatic birdforms are tightly connected with the diversity and the abundance of food that is searched by birds. The species of birds monitored by us are the warblers belonging to the Acrocephalus genus: *Acrocephalus arundinaceus, Acrocephalus schoenoabenus, Acrocephalus scirpaceus*.

The specialized literature shows that the food for *Acrocephalus* is mainly made of insects, a few spiders, snails, small vertebrates and sometimes even fruit and seeds, with the exception of the reproduction period. (Cramp S., 1992, Trnka, Alfred, 1995, Stoate C., 1995)

The techniques of catching prey for the *Acrocephalus* type are very close to those of the *Acrocephalus scirpaceus* species, but the moves for food capturing are less swift. In comparison with the marsh warbler (*Acrocephalus scirpaceus*), the great reed warbler (*Acrocephalus arundinaceus*) tends to eat closer to the ground even at the bottom of vegetation. Catching insects from trees or bushes (willow – *Salix* or oak – *Quercus*) seems to be a frequent practice. (Cramp S., 1992)

The diet for *Acrocephalus scirpaceus* is primarily represented of insects and spiders and occasionally of vegetal food. *Acrocephalus scirpaceus* represents an opportunistic species, flying outside the reeds too, in order to find extra food. (Chernetsov Nikita, 1999, a, b, Grim Tomas, 1996)

The food on *Acrocephalus schoenobaenus* consists mainly of insects, but also of vegetal components, except during the reproduction period. This type of bird looks for food prevailing in the thick, low vegetation, made of bushes and willows as well as in the farming labors and more rarely in the bush periphery. (Chernetsov Nikita, 2000, Cramp S., 1992, Bolshakov, Casimir, 2001)

According to our observations, the great reed warbler tends to eat closer to the ground, even at the bottom of the vegetation, and uses prey of bigger shape than that of
the other species of warblers. The distances it flies through the bushes are very often rather long, reaching a few hundred meters. On nice weather, the great reed warbler (*Acrocephalus arundinaceus*) enters the farming areas and the meadows which surround the lake in order to find food.

As our research indicates, when collecting arthropods, the great reed warblers fly in tandem during the reproduction period, but when the migration period comes, the pairs are no longer together, each specimen looking for food on its own. In the morning, their trips occur repeatedly at short intervals of 10 to 15 minutes and afterwards starting with noontime they get less and less frequent. The food is not eaten outside reeds; it is caught, carried near the nest and crumbled.

Odonats are endowed with a greater mobility and are highly preferred by the great reed warblers in comparison with other arthropods, and this fact was chiefly acknowledged visually in the course of the transects undertaken.

It was observed that *Acrocephalus scirpaceus* (the reed warbler) is an opportunistic species making a few hundred meter trips outside reeds in order to look for extra food, which comprises either Coleoptera or Odonats.

The reed warbler’s flights are low, very close to the water or ground level. Its wanderings recur at intervals of 30 to 40 minutes during a whole day, with an estimated break between 2 to 5 o’clock in the afternoon, and, as it was assessed, insects and snails are consumed, sometimes at the place of their snatching.

The flights are rectilinear, as those of the other specimens studied by us, without any erections, turnovers, or sudden changes of position. During the reproduction period, the male and the female look for food together and very seldom isolated. Sometimes, one partner may remain at the nest place and the other go out and search for food. The pairs are no longer together when the fall of the year comes, the Reed warbler flying alone to get food.

Furthermore, it was investigated and acknowledged that the *Acrocephalus schoenobaenus* (Sedge warbler) feeds itself particularly in an area of low vegetation. Unlike is the other species, we have observed that it very often searches areas of bulrush as well. The Sedge warbler (*Acrocephalus schoenobaenus*) is an introvert species, making fairly short and discreet flights through the aquatic vegetation or the ground vegetation near the water borders. It was also proved that *Acrocephalus schoenobaenus* may be a very altruistic species, prone to chick care and the ones to provide food to the nest is not strictly one member of the clouting pair, but also one or two specimens who act as nursers. They are a real support in nursing the chicks and also provide extra food to the nest.

Our research confirms that food is consumed especially in the reeds and the bulrush which are to be found in the aquatic surfaces. When migrating and having to look for food, warblers make up a real team, acting in groups of 4 or 5 exemplars. The results of the entomological nettings were associated with those of the ornithological captures. During the warblers’ reproduction season (the month of July), in the wet area which we investigated, the richest are the Diptera, the Aranea, and the Hymenoptera (see
Preliminary considerations concerning food disponibilities (...

table 1). The presence in a rather large number of the *Acrocephalus arundinaceus* and *Acrocephalus schoenobaenus* species is tightly connected with a greater number of the above mentioned groups of arthropods.

The warblers have the tendency to fly from the reed towards the farming areas and the meadows which surround the lake, especially during this period. Having in view the number of prey hiding in the reeds, (number of arthropodes exemplaires captured in one day= 235) (see table 1), we consider that both the *Acrocephalus arundinaceus* and the *Acrocephalus scirpaceus* feed inside the reed covered extensions, but also make use of the trophic reserves which are to be found around the waters.

The Sedge warblers (*Acrocephalus schoenobaenus*) focus more on the reed areas, where they can come across other species of arthropods representing their food. Regarding the feeding strategies, *Acrocephalus scirpaceus* carry out longer travels in order to feed and (the same as *Acrocephalus arundinaceus*) to catch mobile insects such as odonats. However, due to their mobility and size, the net caught odonats are not in a direct proportional number with their plenty in the net captures performed.

The largest number of captures belonged to the *Acrocephalus arundinaceus* (22 exemplaires/10 ha) and *Acrocephalus scirpaceus* species (10 exemplaires/ 10ha) which was also examined by means of visual observations, and according to which, it was acknowledged that the largest number of breeding pairs belonged to the *Acrocephalus arundinaceus* (8 breeding pairs/ 10 ha) and *Acrocephalus scirpaceus* (6 breeding pairs/ 10 ha) species.

In the second stage of observations, the greatest abundance of captures in the ornithological nets was ascribed to the *Acrocephalus schoenobaenus* species. With the help of the performed visual observations, in the course of three succeeding days, the dominant proved to be *Acrocephalus schoenobaenus*.

Within the entomological captures carried out during this stage, the greatest number of insects belongs to the Homoptera order, followed by the Diptera order (see table 2). The food availability differs greatly from those in the first period of observation (summer, the month of July) which led to a different placing of the warbler species in that area.

It was acknowledged that during the fall *Acrocephalus schoenobaenus* (8 captures) becomes the richest species both in Iezar Dorohoi and also in North East Moldavia.

During the month of July, the amount of warbler captures (from different species) in Iezar was very high (22 specimens) and a lot smaller at the beginning of September (12).

After the reproduction period, adults feed themselves intensively and after the chicks start to fly, the adult specimens migrate southwards. The youngster remains for a while in the same place; they gain weight and, at the end of August and during September start migrating.
The very small number of captures at the beginning of September is especially due to the cold wave which occurred in North East Moldavia (average temperatures between 15 – 20 Celsius degrees during the day and 10 – 18 Celsius degrees during the night), due to the wind (4, 5 on the Beaufort scale) and also to the very thick fog.

The birdforms, pertaining to the warblers of the Acrocephalus type, travel in migration particularly at night, at a 6 – 10 meter height above the water and only after the rain. The wind represents a serious element for the birdforms as it favors the flights on very long distances and in rather short periods of time. (Schaub Michael, 2001).

Having in view that during fall, the flying orientation is North – South and also that during our observations the wind had a South-North, South-North-North orientation, we have acknowledged that during this investigation period, the migration ceased for a whole week.

Throughout the performed ringing it was observed that the greatest number of captures was recorded in the morning in a 2 to 3 hour interval during sunrise. Within this time, the food availability is represented by Aranea, Coleoptera, Hymenoptera and Diptera (see grafic 2). At the Iezar lake, the greatest number of warblers for this time of day belongs to the Acrocephalus arundinaceus and Acrocephalus schoenobaenus species, but they are also to be found in a fairly big number in the evening.

According to the annotations in the specialized literature (Cramp S., 1992, the Sedge warbler (Acrocephalus schoenobaenus) and the great reed warbler (Acrocephalus arundinaceus) make frequently use of the food reserves both in the early morning hours and also before dawn.

The Reed warbler (Acrocephalus scirpaceus) is a lot more active species, looking for food all day long, when the arthropod communities suffer changes in their content. At noon, the most abundant seizures are the Homoptera whereas in the evening the most frequent are the Diptera.

The marsh warbler (Acrocephalus scirpaceus) uses a more varied food. Its need for caloric energy is bigger because it flies a much longer migration distance (The EBCC Atlas of European Breeding Birds, Their distribution and abundance, 1997), compared with the Acrocephalus schoenobaenus. Although the two species are very much alike concerning their size and the rapport between the body length and the wing length. The data in the specialized literature (Chernetsov Nikita, 1999, a, b, 2000) pertaining to the analysis of stomach content are the same with ours regarding the documentation on the food availability.

Conclusions
The types of the Acrocephalus species bearing distinct ecological requirements used the same habitats for finding food. During the reproduction period, the challenge for gaining the food variety is to be noticed only among the specimens of the same species.

During fall (migration), the challenge among the different types of warblers and the one among the specimens are very moderate.
The seasonal dynamics and the daily dynamics of the reed arthropods are acutely significant in ensuring the food reserves for the *Acrocephalus* species and in decreasing the competition among them.

Another element of great importance is represented by the weather conditions. It was observed that the activity performed by warblers and the competition for food is more intense after rain, wind and low temperatures.

References

2. Bulyuk Victor, 2003 - Relationship between realization of juvenile dispersal in the Reed Warbler (*Acrocephalus scirpaceus*) and weather conditions, Die Volgewarte, 42, p.85
3. Chernetsov Nikita, Manukyan Andranik, 1999 - Zoological Institute, Russian Academy of Sciences, Annual Reports, St. Petersburg, p. 101-106
12. *** 1997- The EBCC Atlas of European Breeding Birds, Their distribution and abundance, Published by Academic Press San Diego, CA 92101
Table 1. Abundance and dominance of arthropodes captured in July month

<table>
<thead>
<tr>
<th>No</th>
<th>Taxon</th>
<th>Abundance</th>
<th>Dominance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Araneae</td>
<td>33</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>Collembola</td>
<td>4</td>
<td>1.7</td>
</tr>
<tr>
<td>3</td>
<td>Thysanoptera</td>
<td>6</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>Heteroptera</td>
<td>2</td>
<td>0.85</td>
</tr>
<tr>
<td>5</td>
<td>Homoptera</td>
<td>53</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>Seria Auchenorrhyncha</td>
<td>27</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td>Seria Stenorrhyncha</td>
<td>26</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>Hymenoptera</td>
<td>28</td>
<td>11.9</td>
</tr>
<tr>
<td>7</td>
<td>Coleoptera</td>
<td>10</td>
<td>4.2</td>
</tr>
<tr>
<td>8</td>
<td>Neuroptera</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>9</td>
<td>Diptera</td>
<td>99</td>
<td>42.1</td>
</tr>
<tr>
<td></td>
<td>Subordinul Nematocera</td>
<td>67</td>
<td>28.5</td>
</tr>
<tr>
<td></td>
<td>Subordinul Brachycera</td>
<td>32</td>
<td>13.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>235</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Abundance and dominance of arthropodes captured in September month

<table>
<thead>
<tr>
<th>No</th>
<th>Taxon</th>
<th>Abundenţa</th>
<th>Dominanţa (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Araneae</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Odonata</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Subordinul Zygoptera</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subordinul Anisoptera</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>3</td>
<td>Heteroptera</td>
<td>7</td>
<td>5.7</td>
</tr>
<tr>
<td>4</td>
<td>Homoptera</td>
<td>49</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Seria Auchenorrhyncha</td>
<td>48</td>
<td>39.3</td>
</tr>
<tr>
<td></td>
<td>Seria Stenorrhyncha</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>5</td>
<td>Hymenoptera</td>
<td>13</td>
<td>10.6</td>
</tr>
<tr>
<td>6</td>
<td>Coleoptera</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Neuroptera</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>8</td>
<td>Diptera</td>
<td>41</td>
<td>33.6</td>
</tr>
<tr>
<td></td>
<td>Subordinul Nematocera</td>
<td>6</td>
<td>4.9</td>
</tr>
<tr>
<td></td>
<td>Subordinul Brachycera</td>
<td>35</td>
<td>28.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>122</td>
<td></td>
</tr>
</tbody>
</table>
Preliminary considerations concerning food disponibilities (…)

Grafic 1. Medium situation of the warblers captures in a diurn cycle

Grafic 2. Medium situation of the arthropodes captures in a diurn cycle