ABSTRACT: Sinanodonta woodiana (Lea 1834) is a new component of malacoфаuna and this condition enhances a new adaptation of predators preying on it. In 2010, during the autumn bird migration, an oystercatcher was observed feeding on this clam species alien to European fauna in the area of drained fish ponds (western Poland). The clams chosen by the oystercatcher were 64 to 98 mm long and 46 to 72 mm tall, whereby stabbing method was preferred to the hammering one. Theses sizes are greater than for other mussel species eaten by the oystercatcher. Mussels were typically collected in the depth of 7 cm, which reflects the maximum bill length in oystercatchers. Under some conditions, e.g. drained fish ponds, the population abundance of S. woodiana clam may significantly be affected by foraging birds, especially oystercatchers as suggested findings from our study.

KEY WORDS: oystercatchers (Haematopus ostralegus), Chinese pond mussel (Sinanodonta woodiana), invasion species, novel food

Eastern and Central Europe are the areas on which invasive species from Asia are observed first. These areas are usually free of their natural enemies, which facilitates their expansion and population growth. This can influence negatively the whole ecosystems, endangering the species native to them. An example of such an invasive species is the Chinese pond mussel (Sinanodonta woodiana). Little is known of its natural enemies and its impact on the ecosystems.

As yet there were very few recorded observations of oystercatchers feeding on alien mussel species (Urbanska 2011). Most of the research describing the oystercatcher during the non-breeding period concern studies made on sea costs. Therefore, the food range of the oystercatcher, which consists mainly of marine organisms, is well-known. However to date, it was not reported a case of the oystercatcher foraging on this invasive Chinese pond mussel.

In October and November 2010 at the bottoms of drained carp ponds in Zgliniec (51°57′03″N, 16°43′15″E) in western Poland, foraging oystercatcher has been observed for several days. A young individual was seen which preyed on the bottom of the drained fish ponds. The bird was observed for four days but only on the 17th and 19th October it was possible to take a series of sharp photographs. On this basis, assuming the beak length of 74 mm (Hulscher et al. 1996), and...
the fact that the birds can penetrate the silt to a depth of up to 90 mm (as they can partly also dip in the mud a part of the head) the depth at which food was extracted from has been estimated. In order to determine the abundance and availability of food, the population of the Chinese pond mussel was examined in the ponds where the oystercatcher preyed. Biometry and sclerochronology methods were used to determine the growth increments of 100 individuals collected in a random sample. Concerning clam shell we have also observed how tight both shell halves can close. It determines the vulnerability that the oystercatcher can open mussel with greater ease.

Feeding on the bottom of ponds with an average sediment thickness ranging from 20 to 50 cm was possible for the oystercatcher, because the water had been recently drained and the mussels did not manage to hide at greater depths. In the case of one pond the oystercatcher preyed 7 days after the water draining, and in the case of another one it was recorded on the third day after the water draining. It was observed that the method of searching for prey depended on the pond. On the second pond the feeding was simplified because the bird did not have to specify the location of mussels with the beak. It managed to locate clams simply looking for them (i.e. by sight), because not all of them had hidden deeply into the bottom sediments. In particular, it explored extensively the area with newly exposed bottom. The most important factor in its search was in this case the proper placement of the shell in the mud, so that it could knock its beak between clam’s halves. In the case of the first pond the oystercatcher had to immerse its bill in the sediments, probe and extract clams to the surface. In addition to mussels it also retrieved a variety of different food – snails (Gastropoda spp.) and dragonfly larvae (Anisoptera spp.). It was pecking with its beak at the mud again and again, no deeper than 7 cm. The observed oystercatcher pecked with its beak vertically until it sensed a shell, then it lined up its beak at an angle of 30 to 50 degrees, so that it could grab and pull the shell to the surface. Then it caught the shell in the middle part, and holding it thus, the oystercatcher walked away, mostly no further than the distance of one meter, to place the shell upright in the mud, hinge down. In order to get to its prey the bird used the typical stabbing method. The flesh of the Chinese pond mussel was extracted in parts, from 1 to 5 (the size of the mussel flesh portion being swallowed by the oystercatcher was 45–50 mm in length and about 32–47 mm in height).

The average total length and height of the Chinese pond mussel drawn from the mud were estimated. The shells retrieved by the oystercatcher had an average length of 74 mm, SD = 14.15 mm, with the smallest shell measuring 64 mm, and the largest 98 mm (N = 7). The oystercatcher was not observed to have any problems with gripping the mussels and placing them in the desired position or reaching into their bodies. The height of these shells averaged 53 mm, SD = 11.03 mm (min. 46 mm, max. 72 mm.). This dimension is important, because using the stabbing method, the oystercatcher has to plunge its beak into the flesh right up to adductor muscles and tear them.

Assuming that the bird can easily prey on specimens with a shell height of 72 mm it was specified that individuals of this species become inappropriate for the oystercatcher only when they reach the age of 5 years. The analysis of data collected has shown that the percentage of shells suitable for oystercatcher’s preying starts decreasing when shells are 5 years old and more. Shells of 7 years old or older are not in the diet of the oystercatcher at all.

The prey size preferred by oystercatchers as quoted in the literature differs greatly, Table 1. Main mussel species included in the diet of the oystercatcher (Urbańska 2011).

<table>
<thead>
<tr>
<th>Species</th>
<th>Preferred size (mm)</th>
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</thead>
<tbody>
<tr>
<td>Edible Mussel (Mytilus edulis)</td>
<td>26–53</td>
</tr>
<tr>
<td>Baltic Tellin (Macoma balthica)</td>
<td>15–20</td>
</tr>
<tr>
<td>Cockle (Cerasterdma edule)</td>
<td>8–39</td>
</tr>
<tr>
<td>Peppery farrow (Scrobicularia plana)</td>
<td>21–39</td>
</tr>
<tr>
<td>Soft-shell clams (Mya arenaria)</td>
<td>28–40</td>
</tr>
<tr>
<td>Chinese pond mussel (Sinanodonta woodiana)</td>
<td>64–98</td>
</tr>
</tbody>
</table>
and ranges from 10 to 70 mm (Zwarts et al. 1996), with mussels of 30–45 mm forming the largest share in the diet (Ens and Alting 1996). As shown in Table 1, the size of preferred mussel species eaten by oystercatchers varies greatly and ranges from 8 to 98 mm.

As research shows more locations of the Chinese pond mussel are being found, not only in Poland, but also throughout Europe, and they are not limited to still water, but include flowing water as well (Douda et al. 2011). Kraszewski and Zdanowski (2007) report that in Poland, the Chinese pond mussel inhabits mostly areas with a depth of 1.5 to 2.5 m in heated lake systems. Their occurrence is limited by the presence of stones, constructions and macrophytes. Thus, carp ponds in Poland form a very favourable sites for the Chinese pond mussel on the whole bottom area with exception of the littoral zone. The chance for an easy access to food thanks to water draining and the large number of the new mussel species recorded in many places may soon be used not only by the oystercatcher, but also by other species, as red fox (Vulpes vulpes) Tryjanowski – unpublished and wild boar (Sus scrofa) Łakomy – unpublished, which were observed preying on Chinese pond mussels.

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REFERENCES


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