Diurnal activity budgets of breeding Eurasian Oystercatchers *Haematopus ostralegus* feeding on limpets on rocky shores

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The effect of different stages of the tidal cycle, weather conditions and the presence of con- and allo-specifics on the time and activity budgets of Eurasian Oystercatchers *Haematopus ostralegus* was investigated. Data were collected at a breeding site on Lundy Island in the Bristol Channel, UK, where Oystercatchers feed on limpets *Patella* spp. on rocky shores. Sixteen behaviours were recorded for 10-minute periods throughout the day. Grooming, feeding, antagonistic behaviours and alertness emerged as the four major behavioural categories from a Principal Component Analysis that was performed on the frequency and durational data. Oystercatchers were more active during low tide than high tide. Frequency and time spent on foraging were greatest during high falling and low falling tide. Time spent on grooming and frequency were high during high slack and falling tide. Alertness was at its maximum during high slack and low slack tide. No clear trend was found in relation to antagonistic behaviours. Type of habitat occupied was also found to have a significant effect on behavioural patterns. Amount of time allocated to different behaviours and the frequency of behaviours displayed a cyclical pattern based on the tide.

**INTRODUCTION**

Animals must allocate their time to exploit their habitat to satisfy basic requirements for food, movements, social interaction and rest. Time activity budgets have been studied extensively as the allocation of time and energy which is important to the survival of all species. A recurring idea in ecological literature is that the life history strategies of animals are inextricably linked with allocation patterns of time and energy (King 1974). Estimation of an animal’s needs through the annual cycle requires an understanding of how these factors affect the pattern of activity and how the habitats are used (Frederick & Klaas 1982). Knowledge of daily activity patterns is essential for the construction of time-energy budgets and for evaluating foraging and survival strategies of animals in seasonal environments (Risenhoover 1986).

The Eurasian Oystercatcher *Haematopus ostralegus* is a bird with a marked temporal variation in its activity budget. Studies on the feeding and breeding behaviour of this bird have shown that time-activity budgets are governed by a tidal regime (e.g. Kersten & Visser 1996a, Meire 1996); tidal cycles have the effect of limiting certain behaviours. It was found that the amount of food intake as well as the choice of main prey species varied depending on whether it was high or low tide (DeVlas *et al.* 1996). There is also some evidence showing a possible connection between social behaviours and the tidal cycle (Ens *et al.* 1996).

Social interactions such as territorial encounters in relation to the tidal cycle and habitat, however, have not been studied as extensively as feeding behaviour. Furthermore, most of the studies on feeding behaviour have been conducted on Oystercatchers feeding on bivalves especially mussels (see review by Blomert *et al.* 1996, Goss-Custard 1996). The effects of different habitats have also been studied: estuaries (e.g. DeVlas *et al.* 1996, Kersten 1996) and sandy beaches (e.g. Zwarts *et al.* 1996a) have been the most commonly studied sites. This pattern of research poses the question whether there are differences between behaviours at the various types of observation site. Indeed, a study conducted by Kersten (1996) in the Dutch Wadden Sea showed that behaviours did differ depending on the type of territory occupied; different habitats led to different behavioural time allocations. Hence the present paper which is aimed at describing the time budget of Oystercatchers and the factors that control it.

**STUDY AREA**

Lundy Island (51°10’N, 4°40’W), with an area of 3.5 km², is located in the Bristol Channel, 17 km off the north coast of Devon, England (Fig. 1). There are many habitat types along its shoreline, ranging from sheltered coves to jagged rocks that are frequently exposed to vigorous wave action and strong winds. The two study sites at which observations were made were selected for their varying exposure to wave action and distribution of rocks. The Landing Bay is east facing, bordered by an eroding slate cliff, about 30 m high, and is partly sheltered. The North Lighthouse is a steep, exposed,

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