To determine the profitability of thin and thick shelled mussels I carried out an experiment. An artificial Oystercatcher bill in cupper was dropped from a standard heigth upon a mussel and the force necessary to open it was measured. It could be shown that for the thicker shells the force necessary to open it increased supraproportional. Hence the mussels are unprofitable. How Oystercatchers can regocnize thin from thick shelled mussels is discused.

DAILY WEIGHT CHANGES AND FORAGING BEHAVIOUR OF GREAT TITS *PARUS MAJOR* : SOME LABORATORY EXPERIMENTS

by

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The aim of foraging in the Great Tit is to accumulate enough energy to survive the night. The amount of food collected and the net rate of intake will consequently be determined by the overnight weight loss, and the daily activity. In most experiments on foraging behaviour, however, the birds performance is studied only for a short time. In this poster I present some preliminary results of an experiment designed to study the foraging behaviour during a long time, and in which the energy demand of the animals was experimentally manipulated.

Birds were individually caged and kept in a room with constant temperature and a 15D/9L photoperiod. They could obtain food from a feeder after hopping on the average fifteen times on a hopper. The whole apparatus was controlled by an Acorn computer. The prey animals used were fly pupae. The feeding time was manipulated by depriving the birds in the morning for two or three and a half hour.

When the birds are active in the morning but get no food (a situation which occurs in the field during the dawn chorus) they reach the lowest body weight at the end of the active period, before getting food. The birds seem to anticipate this extra weightloss in the morning by increasing their evening bodyweight. This seems to hold, however, only after the birds reached a threshold lowest weight.

During the first hours of foraging the birds increase very rapidly in weight, but the rate of increase decreases and remains nearly constant throughout the day after the first two hours of foraging.

The weight of pupae taken is dependent on the feeding time and less is consumed during short feeding time. The intake rate is, however, very constant in the course of a day. Therefore, the high rate of weight increase during the first hours of foraging is due to the retention time of food in the intestine. Indeed, the birds start to defecate after 1.5 hours and the defecation rate is also constant.

During deprivation the birds gain more weight and consume less prey. This increase in efficiency is partly caused by less activity of the birds but physiological mechanisms must be involved as well. Indeed the amount of food consumed/g of faeces is higher during deprivation (12.5 g) than during control (10 g) for both birds. The rate of energy intake is proportional to the energy need measured as the daily weight increase.

In conclusion we can say that there is an obvious but difficult link between foraging behaviour and daily weight changes. It is very difficult to estimate food consumption since animals seem to have both behavioural and physiological methods to save energy.

MULTIVARIATE ANALYSIS OF MACROZOOBENTHOS ON THE SLIKKEN VAN VIANEN

by

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A storm surge barrier is under construction in the mouth of the Oosterschelde, an estuary in the South-Western parts of the Netherlands. This will have a very serious impact on the ecosystem of the estuary. Studies of macrozoobenthos communities can help to predict and understand the changes to be expected.

Since these communities are not sharply bounded, only numerical analysis can be used for an objective study. Recently, some new techniques have been developed. Therefore, it seems wise to compare all prevailable methods, in order to analyse our dataset adequately.

For the classifications, several sorting techniques and different similarity indices were used, on both raw and transformed data. Most sorting techniques give approximately the same results. CANBERRA and BRAY-CURTIS (after logarithmation) dissimilarity indices give well interpretable, but slightly different results. SORENSEN, RENKONEN and MORISITA show some undesired properties and give different results. The relatively new techniques of TWINSPAN (Two Way Indicator Species Analysis) and DCA (Detrended Correspondence Analysis) give results similar to BRAY-CURTIS and CANBERRA.

The results produced by TWINSPAN however, are easiest to interpret. This, together with the fact that a twoway table is produced and that pseudospecies can be defined, by using cutlevels, urges us to recommend TWINSPAN as an elegant and efficient multivariate technique, when complemented with DCA. Analysing the biomass data, we found the same results as with the density analysis. Based on TWINSPAN, the following groups of plots could be distinguished.

Musselbeds are very rich in species, but have a low diversity, due to the dominance of some species. They are situated low in the intertidal area. The commercial beds have a very muddy sediment and a somewhat different fauna.

Another group is formed by plots on sandbanks. These plots have a high diversity, due to a high evenness among the few species. The sediment is well areated and sorted and poor in nitrogen and mudcontent.

The third group consists of quadrats with a very low diversity, situated high in the intertidal area. The sediment is poor in mud and nitrogen.

Three plots situated near N.A.P. form the last group. They have a muddy sediment and a low diversity.

The data from 1982 were also compared with those from 1979. The same communities have been found, but within each community, the quadrats from the same year form a separate group. This may be explained by marked fluctuations in density, biomass and species composition between the years.

COMPETITIVE RESOURCE SHARING : DISTRIBUTION OF ZEBRAFINCHES BETWEEN TWO FOOD PATCHES

by

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Two distribution models have been presented by FRETWELL and LUCAS (1970) to describe the distribution of animals between patches. One of these is the Ideal Free Distribution. In this type of distribution pattern animals should distribute themselves between patches according to patch profitability so individuals get the same pay-off. The major assumptions of the model are : (1) homogeneous patches, (2) no dominance and/or territoriality is displayed by the species, (3) no animal can prevent an other from settling in the patch. Evidence for this model is of importance not only from a theoretical point of view but also for nature conservation. In this poster we describe an experiment in which we tested this model.

Six male Zebrafinches (*Taeniopygia guttata*) were used in our experiment.

In experiment 1 the distribution between patches was studied. The food was supplied in two parts of an aviary by dropping seeds one by one. Either both patches received a seed each 10 s. or one patch received a seed each 5 s. and the other each 10 s. The birds respond to the differences in patch profitability in the expected way. When they are equal no significant difference is found between the number of birds in both patches. When the patches are different, the birds distribute themselves according to the patch