Plenary paper UDC: 639.112

SUSTAINABLE MANAGEMENT OF EUROPEAN HARES IN LOWER AUSTRIA

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Summary: European hare populations are decreasing across Europe. Several factors have been described that negatively affect the hare numbers, namely predation (e.g. by red foxes), human activities (e.g. agricultural land use, traffic, hunting), climate (e.g. increasing precipitation) or diseases (e.g. EBHS). Among them, the intensification of agriculture appears to be the superfactor explaining most of the population decline. Other negative factors, such as predation or wet spring, are more effective if hare habitats are poor in structure and plant diversity. Hence, in optimal habitats negative factors are less powerful. Apart from these ultimate explanations we tried to analyse the proximate causes for the population decline. A reduction in population size can be due to decrease reproductive output or increase (juvenile) mortality.

Therefore, we hypothesized that female hares are less fertile and show a reduction in fecundity. In addition we expected a lower juvenile survival rate. Hares were studied in Lower Austria on four hunting grounds , which differed markedly in population size as indicated by spotlight counts. Two hunting grounds had spring densities of about 50 hares/km2 whereas two further hunting grounds in close proximity had twice as much hares in spring. To analyse female fertility and fecundity we counted placental scars from females sampled in autumnal hunting bags over four years. We found no difference in mean number of placental scars between the study sites and there was no effect of year or of the interaction between study site and year. Females produced between 10 and 12 leverets per year irrespective of the study site. Therefore we were able to show that fertility and fecundity is not reduced in low-density areas and that hares are still a symbol of high fertility. To check juvenile survival rate we analyzed the proportion of young hares in the autumnal hunting bag on the basis of the dried eye lens weights. The proportion of young hares was compared with the number of expected young hares based on the placental scar counts to determine the juvenile survival rate. We found that juvenile survival rate tended to be twice as high in high-density areas , although still low with about 16% juvenile survival rate. Population increase over the year (measured by spotlight counts) was thus dependent on juvenile survival rate but not female fecundity.

The only indication why juvenile survival rate differed between the hunting ground was a clear difference in the proportion of set-asides. Low-density areas had a significantly lower proportion of set-asides and set-aside proportion was positively correlated with spring density and juvenile survival rate. We suggest three hypotheses why set-asides might be beneficial for European hare leverets. 1. On set-asides agricultural activity is rare thus the risk of being killed through harvesting processes is reduced. 2. The structure of set-asides protects juvenile hares from being predated, especially after harvest of cereals in summer. 3. Set-asides provide a variety of preferred grasses and herbs which enables females to produce a high-quality milk. To test the latter hypothesis we determined the plant availability on about 4000 ha, i.e. every field and set-aside was analysed botanically four times a year over three years. In addition we shot 40 hares in February, May, August and November in three years to obtain stomach content and described plant preference with Chesson's electivity index. We found that hares do prefer winter wheat and food supply (sugar beet and carrots) in autumn and winter but positively selected set-aside plants in spring and summer. Hares seem to actively search for these herbs (especially Fabaceae) and find them on set-asides. As we know that hares produce an energy –rich milk we expect that these herbs contribute a lot to the rapid growth of leverets, being born with about 100g and being weaned with about 1kg.

To estimate predation pressure we counted raptors and crows during late spring in the study sites. Interestingly, the number of raptors seen per km was positively correlated with hare density and thus juvenile survival rate. Raptors seem to be attracted by high hare densities but do not affect hare population dynamics, if raptor numbers are below a certain threshold. In contrast, hare density and number of counted crows per km was negatively correlated. The more crows the less hares.

Our results strengthen the benefits of a combined management strategy in which the management of small game habitats is the most important task , followed or paralleled by predator control.

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However, predator control alone is not sustainable if habitats are of poor quality. Moreover, a improved small game habitat is not only beneficial for hares, partridges, pheasants and quails but also beneficial for non-game species such as small ground-breeding birds, insects, spiders and rare arable plants. By managing hare habitats hunters thus can improve their image of being an important group for the conservation of biodiversity.

Key words: Sustainable, management, hare, Austria