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## FUNCTIONAL RESPONSES OF HUMAN HUNTERS TO THEIR PREY – WHY HARVEST STATISTICS MAY NOT ALWAYS REFLECT CHANGES IN PREY POPULATION ABUNDANCE

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### ABSTRACT

Harvest records are often assumed to offer an indirect measure of population abundance in huntable species. However, this requires population density changes are reflected in comparable linear changes in harvest rates. We tested this assumption for common snipe *Galinago gallinago*, common wood pigeon *Columba palumbus*, coot *Fulica atra*, grey partridge *Perdix perdix*, roe deer *Capreolus capreolus* and brown hare *Lepus europaeus* in Denmark. If we consider hunting a form of predator-prey interaction, the annual kill can be viewed as a predator functional response to prey population size. Convergence of the annual kill to a type I functional response with similar auto-correlative structures in the harvest and count data would support the hypothesis that fluctuations in harvest and population abundance occurred with similar periodicity. The annual kill of common snipe showed the best fit to a type I functional response to the point count indices, with similar auto-correlative structures in the two variables. Other species showed different functional responses, the result of hunter behaviour, such as voluntary hunting restraint on species of concern and saturation effects from rapidly expanding abundant species. Relationships between the annual kill and population abundance were complex and incorporation of hunting legislation changes improved optimal model fits between harvest statistics and count data. Consideration of the validity of the underlying assumptions is necessary before harvest records are used as an index for population size. It is essential that detectability/accessibility of a species does not change systematically over time. Such bias may derive from habitat shifts, difference in timing of counts and hunting harvest, changes in migration patterns and annual reproduction and mortality. We recommend the continued collation of hunting harvest statistics, supported by sociological studies, to provide insight into the mechanisms that affect the hunting effort, to understand relationships between harvest statistics and population abundance.