

Dynamics caused by grazing on different scales: concepts for the investigation of vegetation structure

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Within the BMBF-project (1) "Inland sand ecosystems: dynamics and restitution" (see abstract SCHWABE et al.) we are able to investigate replicated fenced and grazed plots in different vegetation complexes (e.g. typical and ruderalized *Koelerion glaucae* complex, *Armerio-Festucetum trachyphyllae* complex and others). Besides nutrient ecology the dynamic responses of vegetation structure under the grazing impact is a main theme of the project. Connexes between vegetation structure and animals as grasshoppers (*Ensifera/ Caelifera*) and bees (*Hymenoptera Apoidea*) are studied too. In a further step another main target is to scale up the data in order to get results for the landscape level. We use the following approaches to study the vegetation structure on different scales:

Large scale investigations I (level of population): Quantitative data of the flower- and fruit phenology are sampled in some fenced/ not fenced plots following the method established by KRATOCHWIL. Especially the seed production of threatened species as *Veronica verna*, *Silene conica*, *Silene otites* and others will be investigated.

Large scale investigations II (level of micropattern of populations): Horizontal structure of vegetation and the dynamic processes in the time axis are studied at a very fine grid base (5 x 5 cm) using the positioner method after NOBIS (see abstract NOBIS). The vertical structure is recorded by taking digital images (after ZEHM) of fenced and grazed plots and is analysed with a specially elaborated software. Vertical arrangement of biomass, size of vertical gaps and a relative value for biomass can be determined.

Large scale investigations III (level of plant communities and vegetation complexes): Plant communities and vegetation complexes are sampled and mapped according to the classical methods.

Small scale investigations based upon special aerial photographs (colour infrared film material) are taken annually before grazing (may). The vegetation pattern will be quantified. For this purpose different methods of digital image processing on the one hand and analyzing tools of Geographic information systems (GIS) on the other hand are used. In combination with the results of the detailed examination it will be possible to describe some dynamic processes. Further methods to scale up these studies into the landscape level will be elaborated.