Expansion of Rosa rugosa in Coastal Dunes

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Shrubs in Coastal Dunes
The non-native Rosa rugosa establishes and spreads both in yellow dunes as well as in landward following grey and brown dunes (Fig. 1). As a result of dense dominant stands, many plant species of typical dune communities are shaded out.

In comparison to the native Hippophaë rhamnoides, Rosa rugosa occupies a larger ecological niche (Fig. 1). From these introduced sites, R. rugosa spreads into neighbouring dune areas, and due to tillers, it creates large, dominant and dense stands. Today it is widely distributed along the German North Sea Coasts.

Rosa rugosa occurs in dunes in various forms because of garden escapes that go wild, and which based on different cultivars.

In short – in coastal dunes

Rosa rugosa
- establishes in all dry dune habitats
- changes the environmental conditions
- reduces species-richness and species-diversity
- outcompetes especially light demanding species
- displaces many typical dune communities
- effects are similar in all dune habitats
- effects are similar at different scales (1-16 m²)
- ecological consequences are more improved in comparison to Hippophaë rhamnoides

Light availability
In general, relative light availability beneath shrubs decreases with increasing shrub cover. At different growth- and leaf-forms, shading by R. rugosa is clearly more pronounced than shading by Hippophaë rhamnoides (Fig. 3). In the case of H. rhamnoides, the relative light availability decreases to about 20%, but in the case of R. rugosa there is a more or less complete shading.

Species-richness of Coastal Dunes
Coastal dunes are one of the most valuable habitat type in Europe. They are often species-rich (Fig. 4) and contain many regionally rare plants. Therefore, dunes represent priority habitat types of the European FFH Directive. The preservation of semi-natural dune grass- and heathlands has a high conservation priority and the expansion of species-poor shrubland poses a serious conservation problem.

Decreasing Species-Richness
Total species-richness decreases with increasing cover of R. rugosa, and declines in all dune vegetation types. The number of typical grassland species declines especially in the case of species-rich Corynephorus-swards, but also in the case of Ammophila-vegetation and Empetrum-heathlands (Fig. 5). Moreover, the number of Red-Book-species decreases with increasing R. rugosa cover. Furthermore, decline in species-diversity (Shannon, evenness) is more improved in the case of R. rugosa than in H. rhamnoides.

Conclusion
Decline in species-richness, change of vegetation composition as well as reduction of landscape diversity due to extensive dominant stands manifest Rosa rugosa as a serious problem in relation to sustainable protection of biodiversity in coastal dunes.

References

Fig. 1. Rosa rugosa and Hippophaë rhamnoides in coastal dunes.

Fig. 2. Rosa rugosa marking the boundary of pathways (above left). Flowers and hips.

Fig. 3. Decreasing light availability with increasing cover of Hippophaë rhamnoides and Rosa rugosa.

Fig. 4. Species-richness in dunes, for example with Polygala vulgaris, C. cladina, C. perlatum, C. sylvatica, S. articus, S. aucuparia, E. nigrum, P. piliiferum.

Fig. 5. Decline in the number of grassland species with increasing Rosa rugosa cover in different dune types.