Production of ecological species for high-zone restoration and landscape construction

By Dr. Bernhard Krautzer and Dr. Wilhelm Graiss, HBLFA Raumberg-Gumpenstein

Species-rich seeding in medium- and high zones have gained increasing importance in recent years. Above all for recultivation in the course of the realisation of large building projects (lifts, runs, snow-making systems, storage power stations, roads and railroads, hydraulic engineering and tourism infrastructure), this form of restoration comes increasingly to the fore in wide spheres of the project areas.

Together with the classic requirements, such as rapid surface protection, sufficient slope safety and restoration stability, the biotope- and species-protection function of the grassland to be created, however, must be increasingly taken into consideration. The areas that are suitable for restoration must also be seen as potentially ecological areas of compensation. A prerequisite for the successful realisation of these aims is the production and availability of the seed of suitable, site-specific species.

Within the sphere of 15 years of cooperation between the HBLFA Raumberg-Gumpenstein and Kärntner Saatbau, the scientific basis for the production and practical use of site-specific grasses, leguminosae and herbs were systematically examined. Parallel to this work, the commercial production of what in the meantime amounts to 22 species have been assembled for use in restoration mixtures for high zones and road- and landscape construction. Thus for innovative farmers and seed producers has been created the possibility of a lucrative, non-regulated production that can contribute to assuring the agricultural incomes of these operations. The demands placed on the production technique are extreme. Seed production of site-specific ecological species can therefore be described as being plant cultivation at the highest level. Only few firms with many years of experience are in the position to fulfil the extreme demands for produc-

tion quality with sufficient yields. Why is that?
Common to all site-specific species is slow early growth and slight competitive resistance compared to cultivated species and varieties.

All species require a perfectly prepared seed bed. Measures for plant protection must be made as early as possible to avoid severe loss in yields. Biological growing is therefore out of the question for most of the species. Site-specific grasses above all show high tendency to rust. Only early counteraction with suitable fungicides can hinder large areas of damage to the stock. The regulations of the respective country are to be observed for the use of plant-protection agents in respect of permission, use and pre-

Reproduction stock of anthyllis alpestris

Threshing of festuca supina in Marchfeld

Seed harvest of poa alpina at the foot of the Grimming

cautionary measures.

The production of most of the species described in Table 1 is much riskier and significantly more expensive than the production of conventional seed. For viable production, it is above all the production costs, yields and profit that are essential. An economic assessment of the production of site-specific species within a research project for the optimisation of seed production showed a satisfactory contribution of cover by most of the site-specific species. The greatest caution, high preparedness for risk and a learning process over several years are prerequisite.

Nevertheless, for such niche sectors there is a law unto itself. The market is relatively limited. The lack of legal regulations still permits the use of seed mixtures of species that are not ecologically suitable, but which are significantly cheaper. Site-specific seed mixtures as a product can only be sold with intensive and high-quality expert consultation. In recent years, however, an extremely encouraging trend has been seen. Especially ski-run operators, who have already had several years of experience with the use of high-quality mixtures of ecological species, are now convinced of the quality of this product. In the calculation of costs for restoration in the medium-term, including subsequent costs for cultivation, fertilisation and maintenance, the "more expensive" site-specific mixtures prove to be cheaper!

A comprehensive summary of the scientific research work, and the practical experience with 25 different species, is given in a book to the title of "Site-specific Grasses and Herbs. Seed Production and Use for Restoration in High Zones", ISBN 3-901980-77-6. The book was published by the HBLFA Raumberg-Gumpenstein, Raumberg 38, A-8952 Irdning, Austria, and can be purchased at the cost price of € 8.

Table 1: Basic restoration characteristics of site-specific ecological species (after Krautzer et al, 2004)

Species	Vegetation zone			Original rock		Humidity		Resistence to			Fodder value	Sod density
	montane	sub-alpine	alpine	silicate	carbonate	dry	wet	fertilising	cut	grazing		
Grasses												
Wavy hair grass	+	+	+	+	-	+	(-)	(-)	-	(-)	-	(-)
Violet meadow grass	-	+	+	+	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)
Perennial quaking grass	+	(+)	-	+	+	+	(+)	(+)	+	(+)	(+)	+
Upright brome	+	(-)	-	+	+	+	(-)	+	+	(-)	(+)	(+)
Tufted hair grass	+	+	+	+	+	(-)	+	+	(+)	+	-	(+)
Alpine chewing's fescue	+	+	+	+	+	+	(+)	+	+	+	(+)	+
East alpine violet fescue	-	+	+	+	+	+	(+)	+	+	(+)	(+)	+
Festuca pseudodura	-	(+)	+	+	(-)	+	(-)	(+)	-	(+)	-	(+)
Tufted fescue	-	+	+	+	(-)	+	(-)	(+)	(-)	+	-	+
Variable fescue	(-)	+	+	+	(-)	+	-	(-)	-	-	-	(+)
June grass, crested hair grass	+	+	-	(-)	+	+	-	(+)	(+)	(+)	(-)	(+)
Phleum hirsutum	(+)	+	+	(-)	+	+	(-)	+	+	+	(+)	+
Alpine cat's tail	(+)	+	+	+	(+)	(+)	+	+	+	+	+	+
Alpine meadow grass	(+)	+	+	(+)	+	+	(+)	+	+	+	+	(+)
Leguminosae												
Common kidney vetch	+	(+)	-	(-)	+	+	-	(+)	(-)	(+)	(-)	-
Alpine kidney vetch	+	+	+	(-)	+	+	-	(+)	(-)	(+)	(-)	-
Snow clover	-	+	+	+	(+)	(+)	(+)	(+)	+	+	+	(-)
Herbs												
Common yarrow, milfoil	+	+	(+)	(+)	+	(+)	(+)	+	+	+	(+)	(+)
Rough hawkbit	+	+	+	(+)	(+)	(+)	(+)	(+)	(+)	+	(+)	(-)

Legend: + = very good, (+) = good, (-) = bad, - = very bad

Kärntner Saatbau