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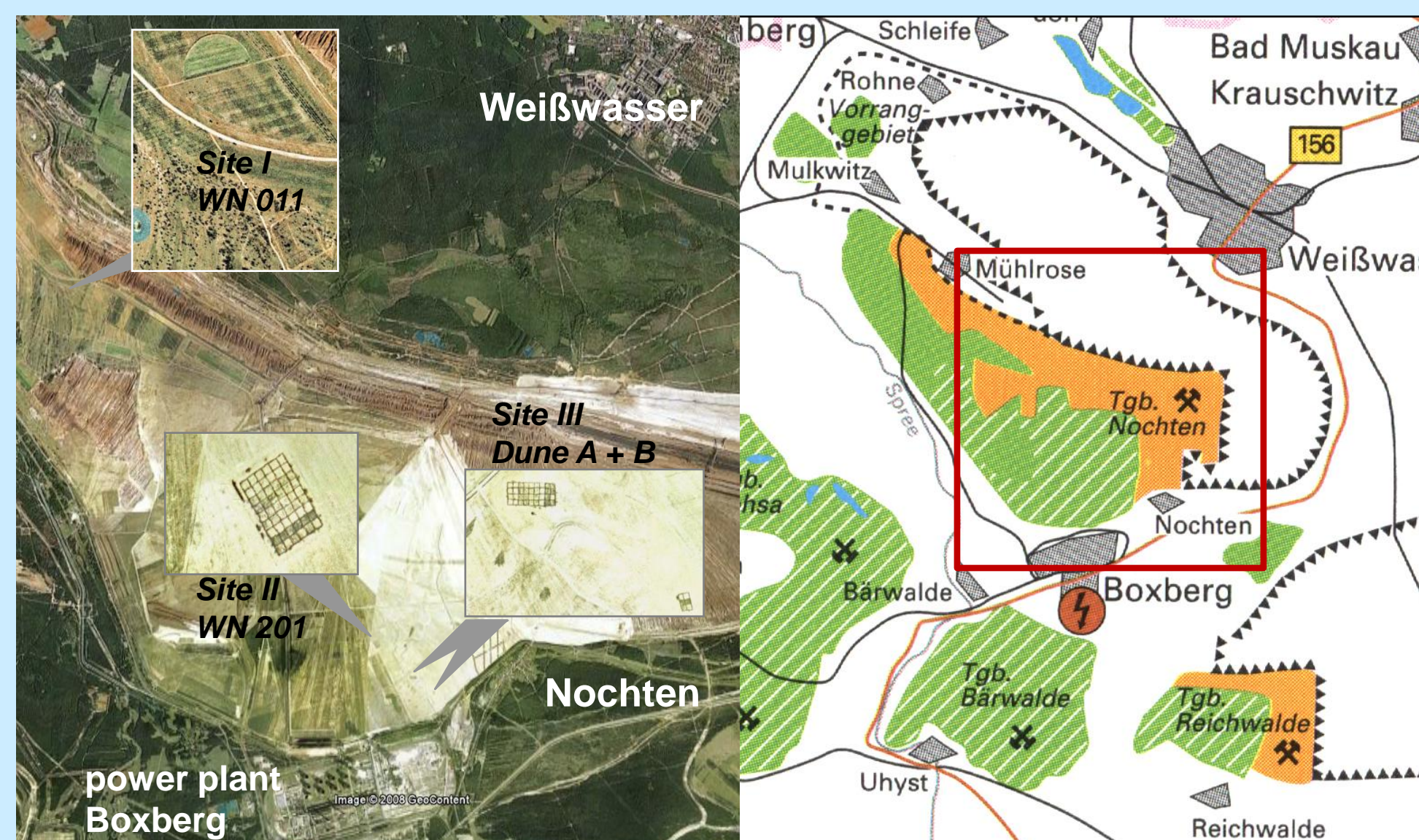
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Motivation und Background

Former landscape of the open-cast mine Nochten (NE Free State of Saxony) was part of one of the classic heathland regions in East Germany. For this reason, it is necessary to search for possibilities to re-establish initials of heaths restoring the post-mining landscape. Several research approaches to initialize *Calluna*-heathlands in Lusatia were made during the last decades (e.g. BLUMRICH & WIEGLEB 1998, BLUMRICH 1999). But no investigation took into account the special condition of the post-mining landscape Nochten.

Investigation Area

Two test sites were located north of the village Nochten and the power plant Boxberg (site II and III). Additionally, one site (I) was near the northern residual gully (14°28'48"-14°40'07"E and 51°28'53" - 51°25'11"N, Free State of Saxony). Site I and II were plane while site III was inclined. The latter one was located on the slopes of an emission protection wall, the so-called "Nochten dune". Except of site I all test sites were established on loamy sands.



Methods

In order to provide the necessary database, site parameters of 20 spontaneous settlements of *Calluna vulgaris* from several dump sites (Brandenburg-S and Saxony-NE) have been analyzed.

As parts of the experiment, the use of regional seed (capsules) and mowing material, sods from surrounding heaths as well as young plants of heather were tested on a plane and an inclined site each. Three experimental blocks (sparse protective sowing with *Festuca brevipila*, birch shelter planting, control variant) were considered.



Mowing technique for regular cutted heathlands

The field trail started in autumn of 1999 with repetitions of all experimental plots established in following spring. All plots were 100 m² in size and surrounded by walls (50 cm in height) made of birch twigs. Heather plants were 3 to 5 years old and classified into four size classes. For seeding whole capsules were used in a density of 1.5 g*m⁻². A final control investigation was carried out in 2008, eight years (vegetation periods) after starting the experiment.

Growth classes of heather seedlings used for planting and their characteristics

Growth class	Characteristics
I	appr. 3 cm in height, only 1 dominant shoot, non-flowering
II	appr. 5 cm in height, 3-7 shoots, with or without first inflorescens
III	up to 10 cm in height, diameter of plant appr. 5 cm, compact growth
IV	up to 15cm in height, diameter of plant appr. 10 cm, relaxed growth

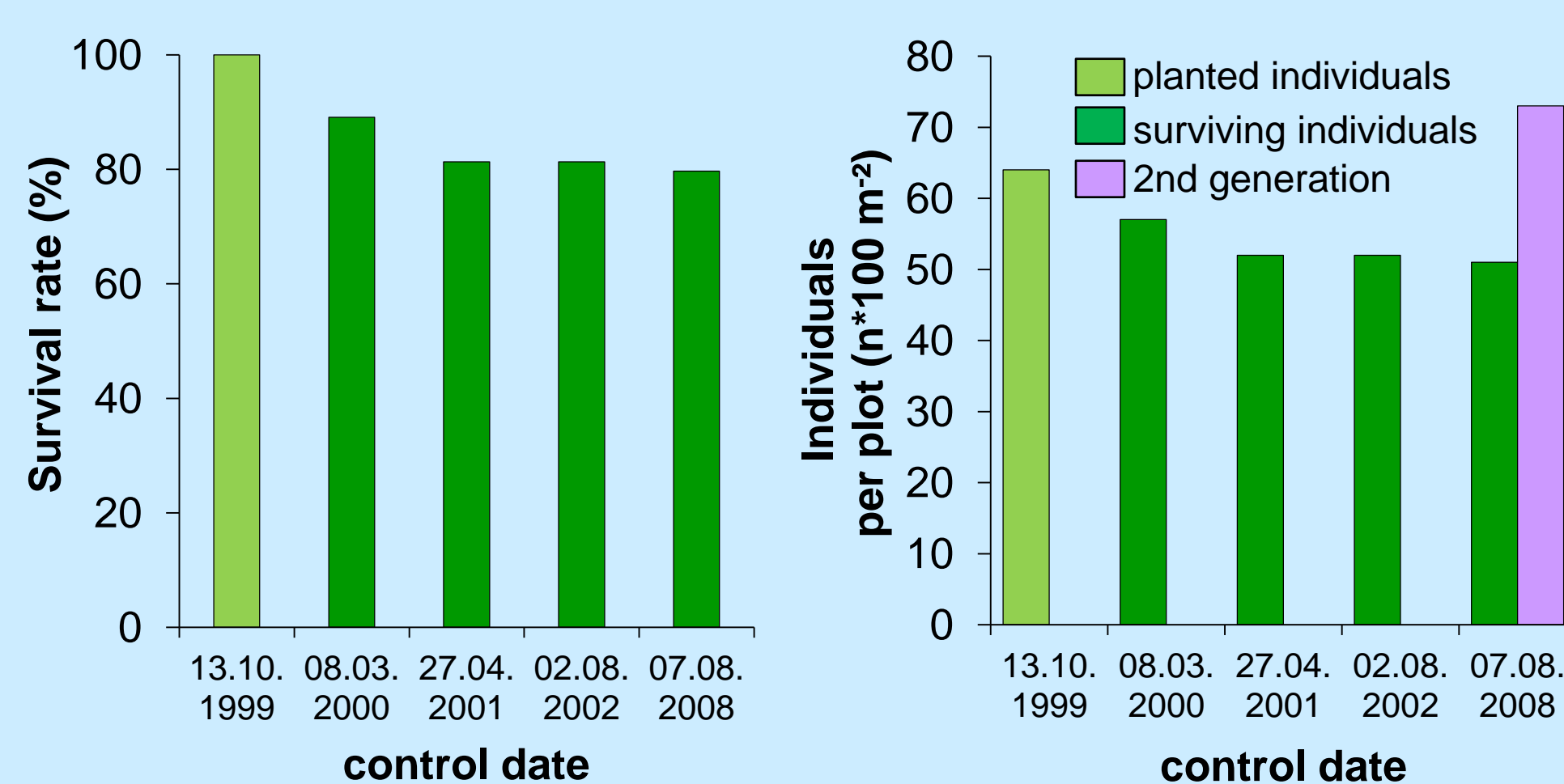
Results

After evaluation of data from spontaneous settlements as well as from field trails following recommendations for the initiation of heathlands are given. Sites with low base saturation (below 40%), rich in fine-sand fraction (> 20%), low pH values (3.5 to 5.0), phosphorus and potassium deficiency, medium to wide C/N ratios and with increased silt and clay content are most suitable.



Test plots with shelter walls and mowing material (foreground).

Planting of young heather plants is predominantly unproblematic. It should be only realized in autumn using middle-sized 2 to 4 years old container plants (class I, II). After 3 years the survival rate is usually 50 - 75%. Older or larger plants (class III, IV) grow significantly worse. Due to a rapid development of inflorescences a 2nd Generation of plants appear 3 to 5 years after planting.



Survival rate and development of plant number on a planting plot (plane, site II).



Development of young heather plants after planting 8 months 24 months 48 months

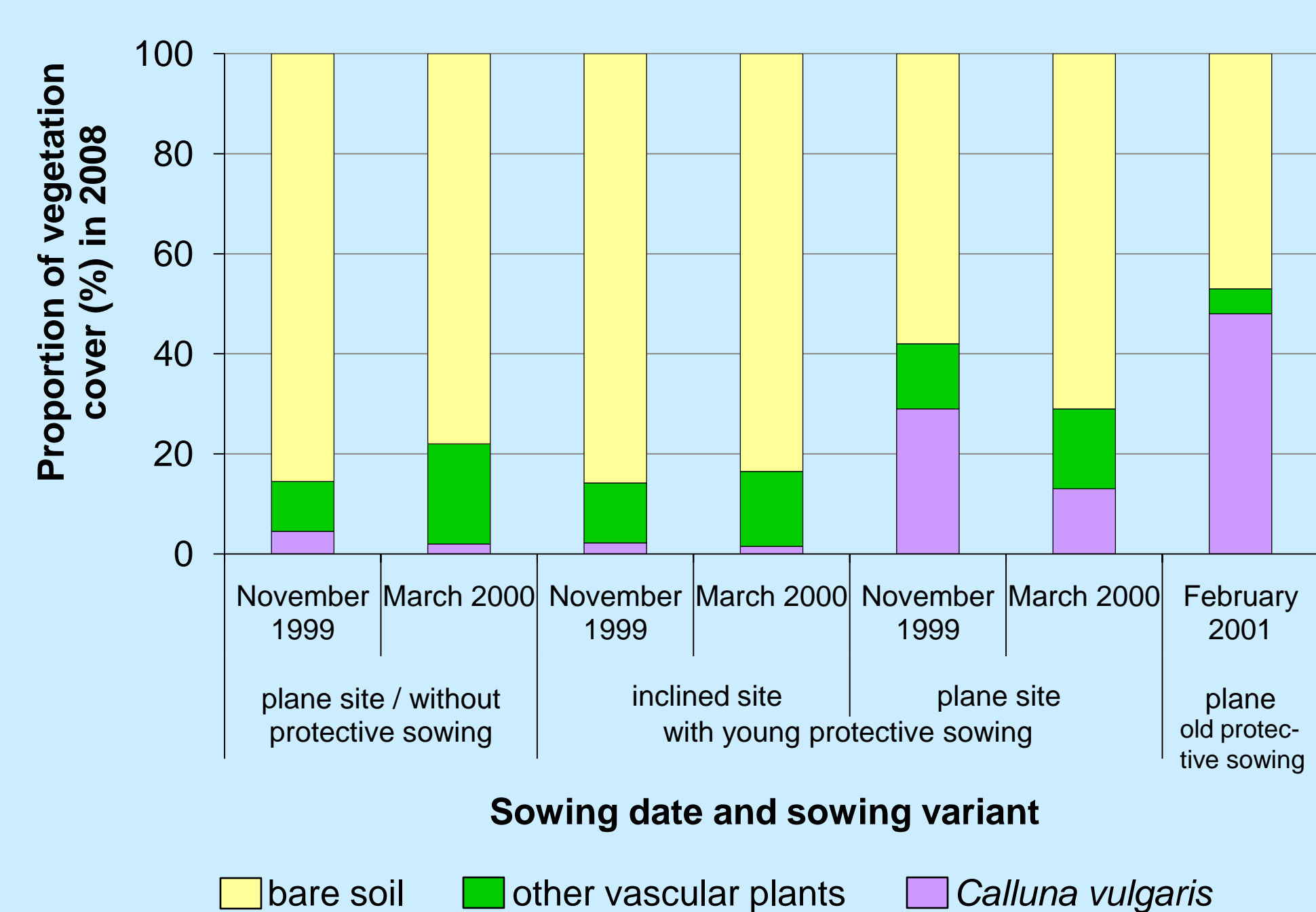


Slightly inclined plot with young heather plants eight years after planting at site III.

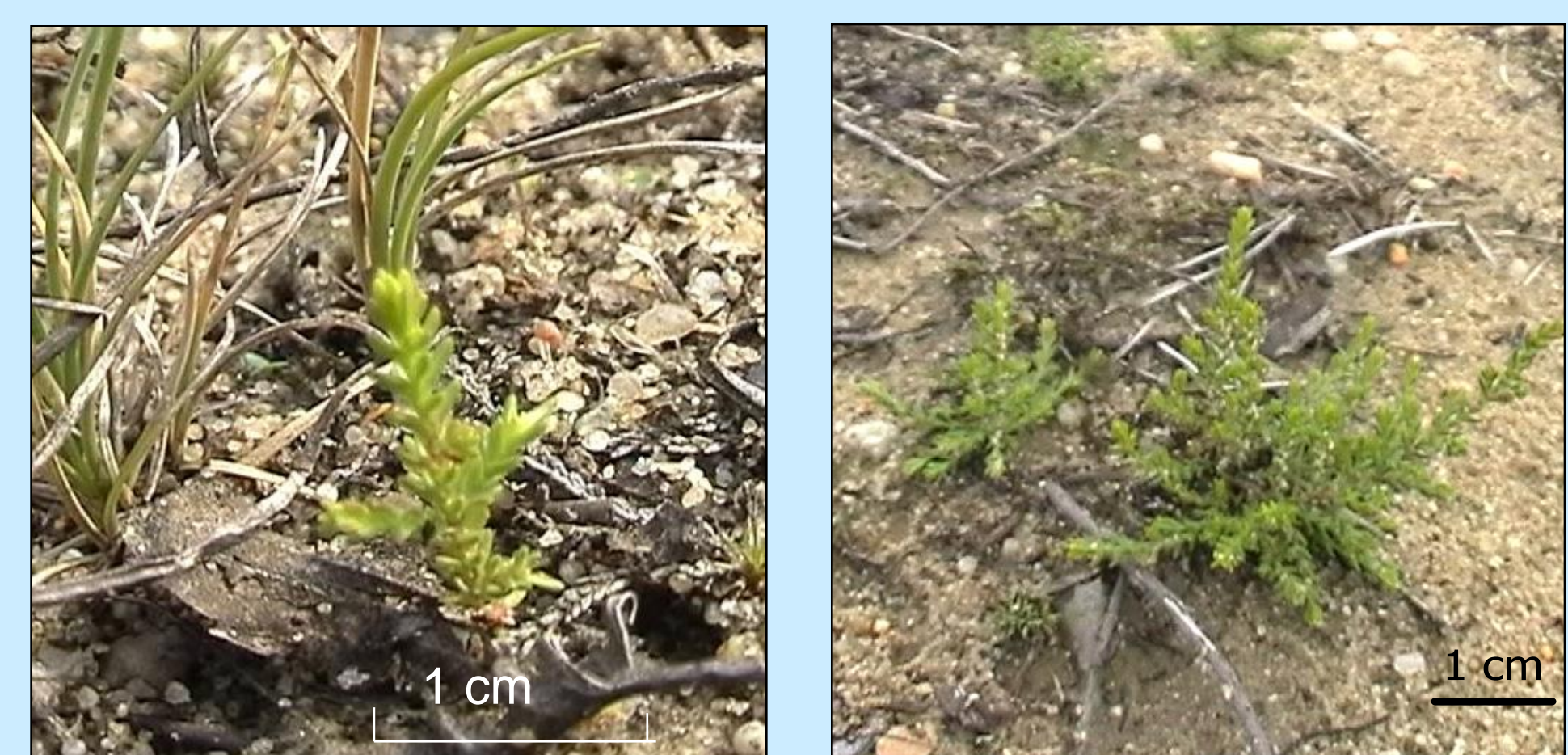
Sowing of heather is only successful on plane sites after establishing a sparse protective vegetation cover or in the presence of spontaneous pioneer vegetation. At the age of 15 months the grass vegetation developed from seed stock had a optimal structure.

Inhibitory effects on the developing heath are not observed. Following a critical establishing phase a well developed heath cover is established within five years after sowing.

Using sods, however, bear the risk of displacement of stolons of *Calamagrostis epigejos*, which subsequently benefits from nitrogene output of the shelter walls.



Development of heather and spontaneous vegetation on sowing plots after eight vegetation periods.



Conclusions

To initialize heathlands on dumps base deficient sites (base saturation below 40%) with high proportion of fine sand (> 20 %) and higher clay and silt content should be used. Sites with flat surfaces and an old grown protective vegetation are most suitable for sowing. Plantings are particularly advantageous on inclined locations. Actions to protect sites against wind and water erosion are needed in any case. Sometimes heathland overburden transfer bears the risk of rapid development of Wood reed (*Calamagrostis epigejos*) as many donator sites are infested by this weed. To increase the spatial structure as well as age differentiation combinations of methods are recommended. This results in a better spreading of risk do to a successful initiation.

	hilltop sites	hill slopes	flat surfaces	undulating relief
planting of young heather plants	very suitable	very suitable	very suitable	very suitable
use of sods / overburden transfer	suitable	suitable	suitable	suitable
use of mowing material	conditionally suitable	conditionally suitable	very suitable	very suitable
sowing	not suitable	not suitable	very suitable	very suitable



Young *Calluna*-heathland on a dump site initialized by using overburden transfer from a neighboring old-grown heathland.

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