Phd-project: Vitality of Heather (*Calluna vulgaris*) in dry heathlands
along gradients of climate, structure and diversity in the North German Lowlands

Rethinking relations between heather plant age, growth stages and vitality

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21.08.2017

gefördert durch das Stipendienprogramm der Deutschen Bundesstiftung Umwelt

DBU Deutsche Bundesstiftung Umwelt

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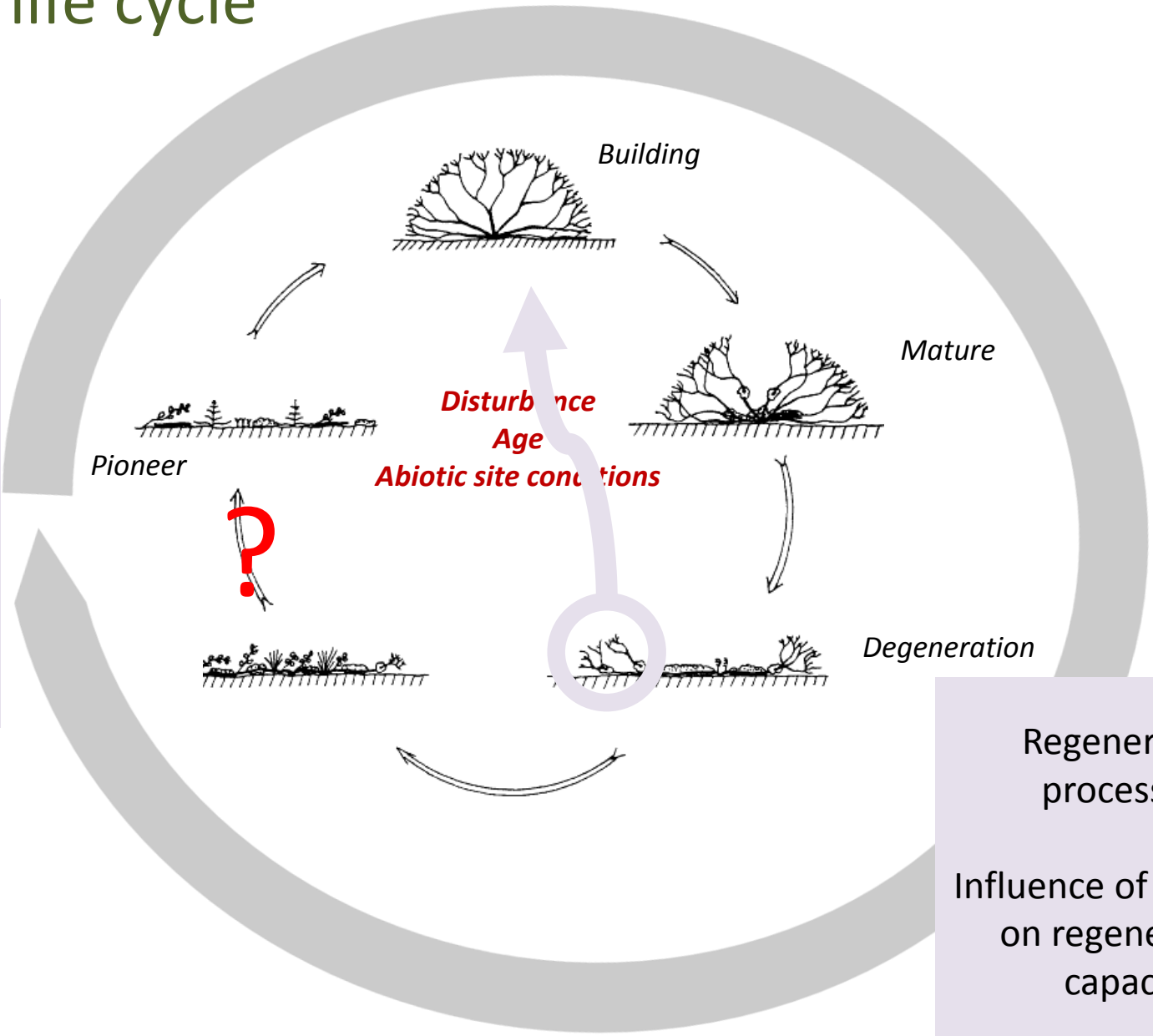
Vegetationsanalyse & Phytodiversität
mit Altem Botanischen Garten

Heather life cycle

Timespan of whole life cycle and longevity of plants in growth stages ?



Regeneration processes?

Influence of plant age on regeneration capacity

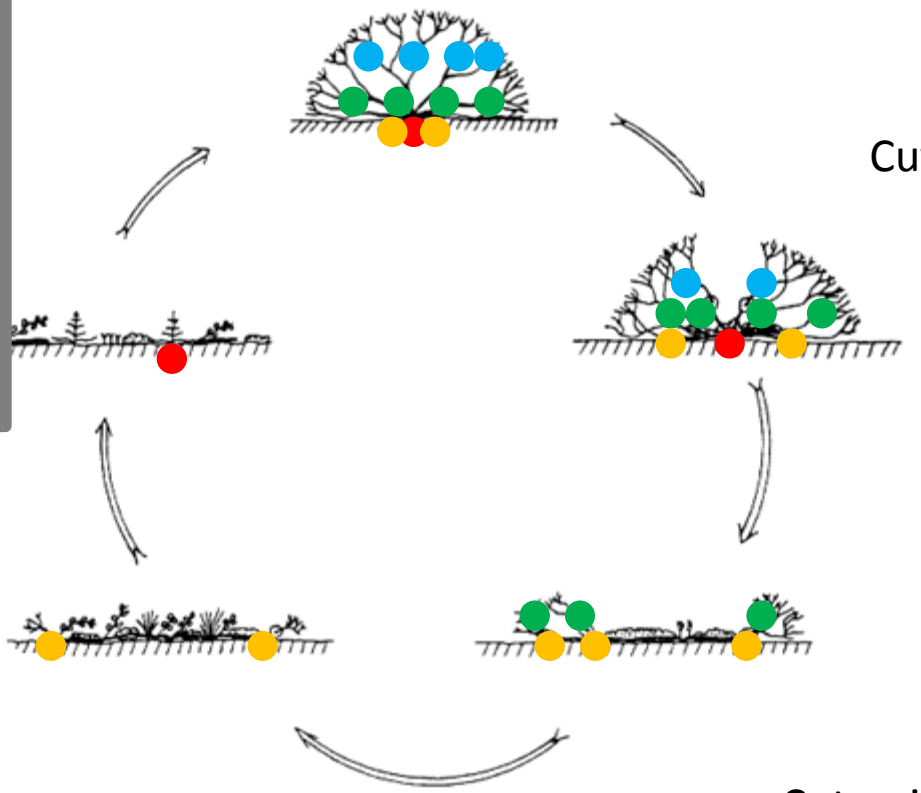
Life cycle concept basing on Watt 1955 & others, picture: Gimingham (1975/1987), modified

Sampling

19 study areas
352 plots (25m²)

1724 heather plants
(<= 2 from each growth stage)

1 - 3 cut points / plant
1 - 5 wood samples / cut point

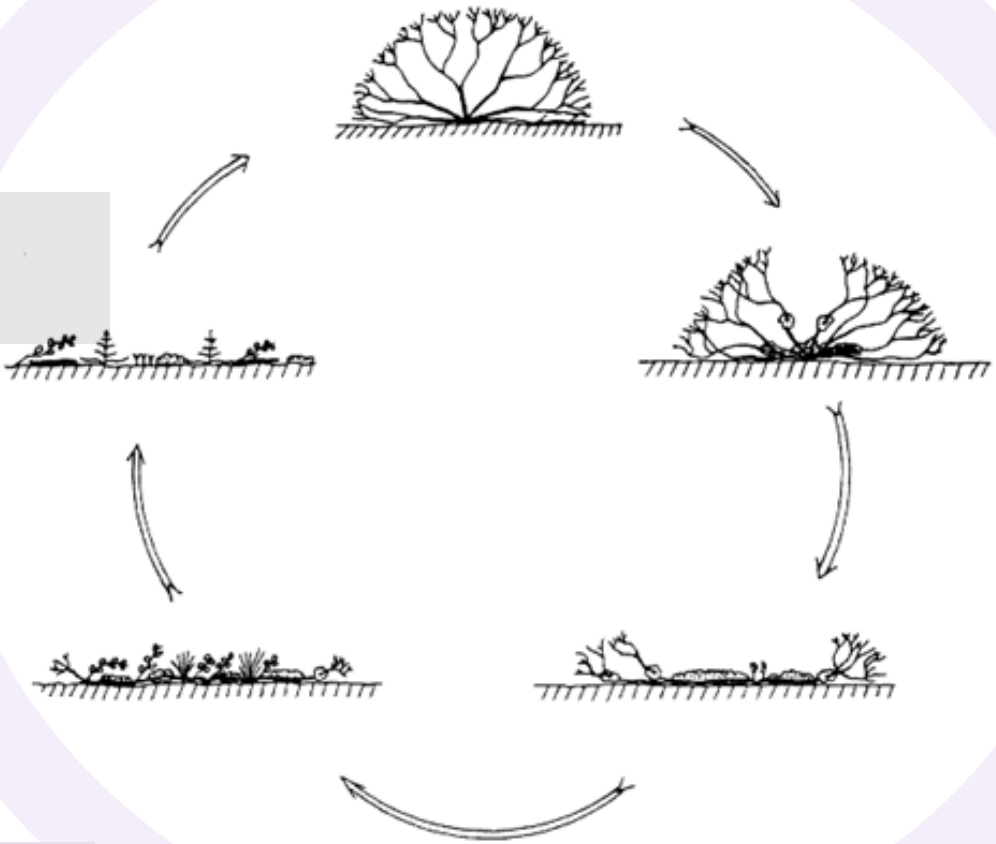


Cut points individuum age
- Rootstock
- Stem base

Cut points aboveground age
- Aboveground: 20 - 25cm height
- Aboveground: 10 - 15cm height

Conclusions: primary life cycle

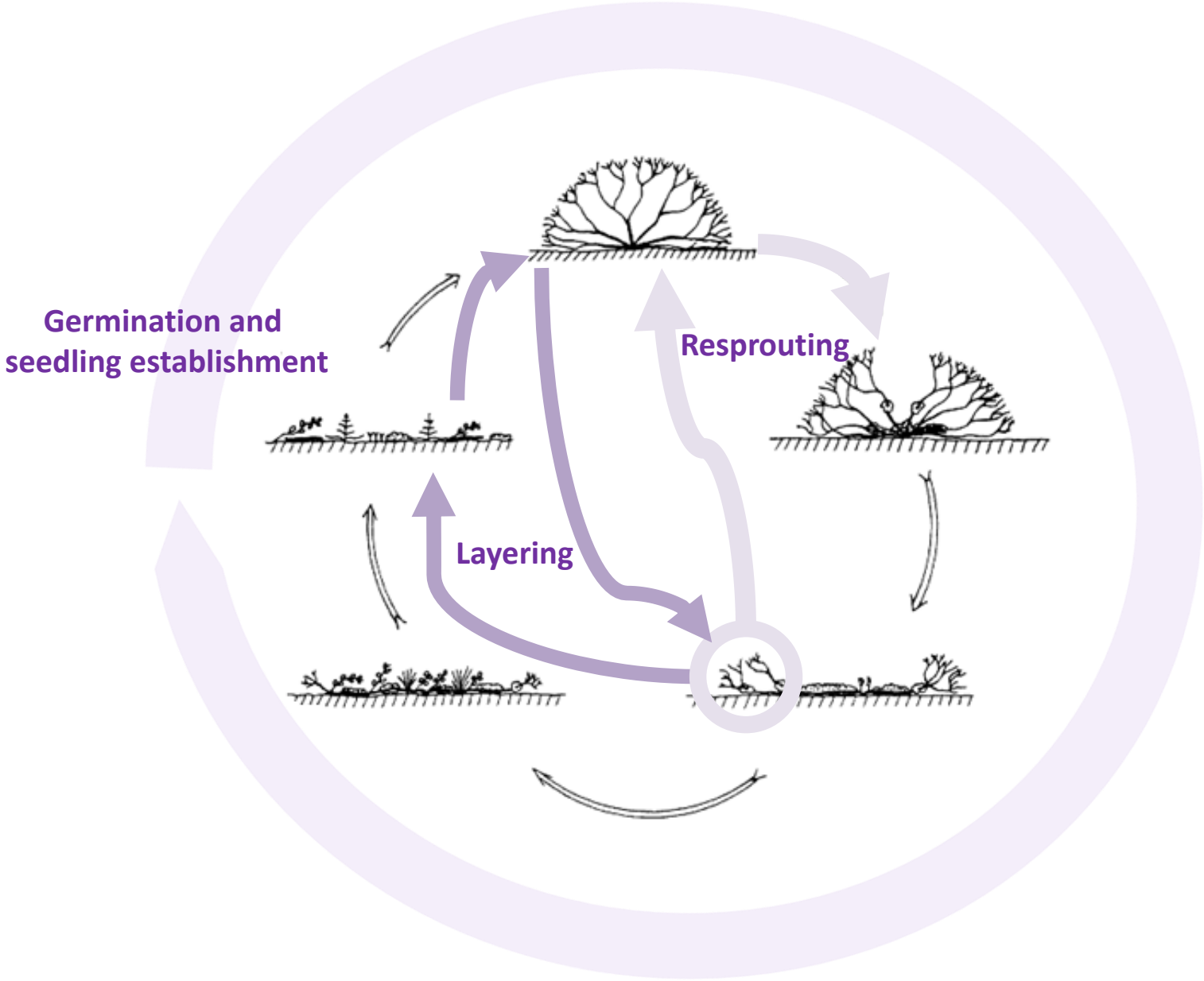
Age of plants in growth stages



Fast grow-up to mature

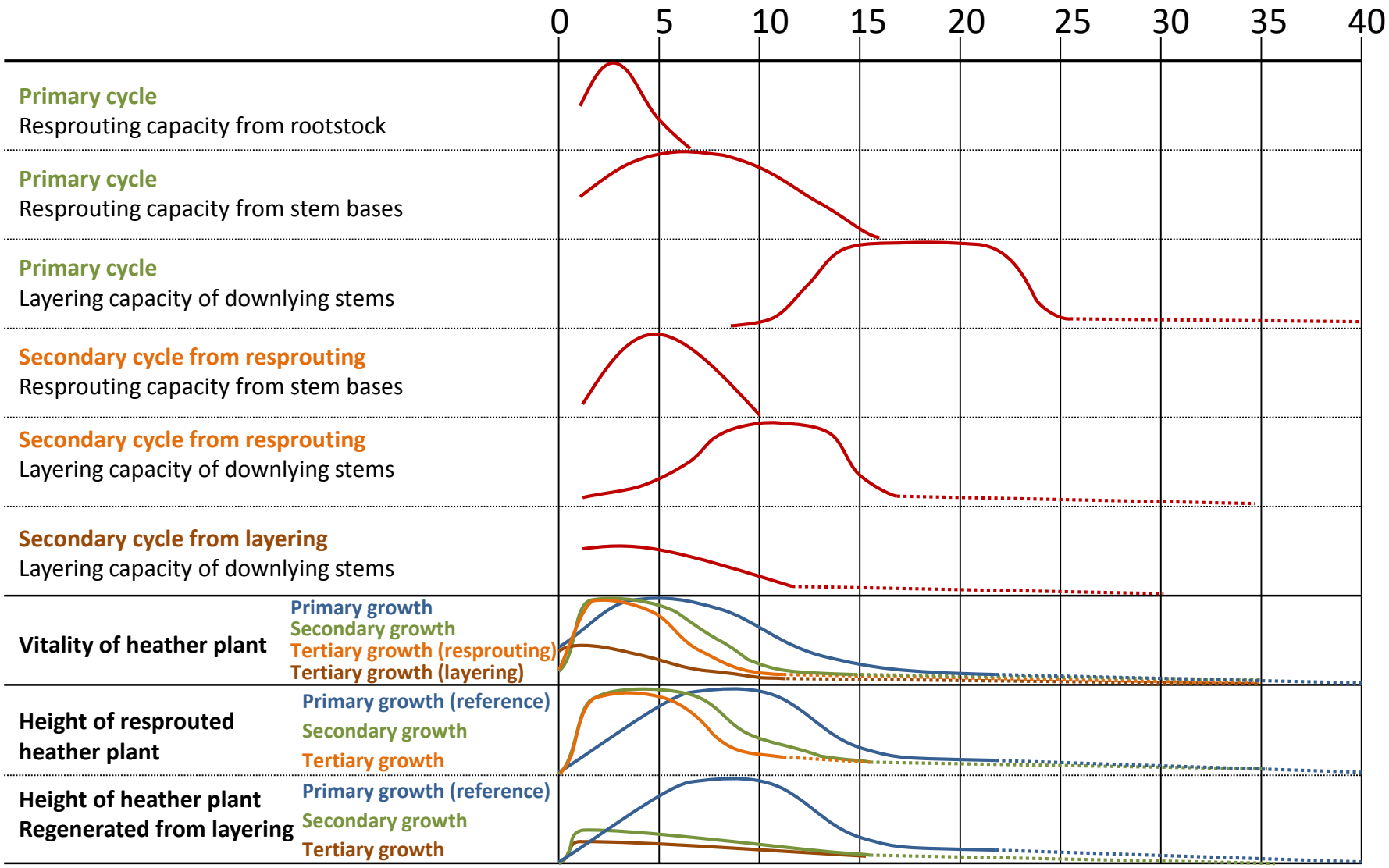
Primary life cycle (undisturbed) ends after 15 - 20 years

Regeneration processes



Regeneration ~ age

Regeneration patterns and vitality after intense management



Conclusions: Regeneration life cycle

Persistence of plants
in growth stages

Lifespan

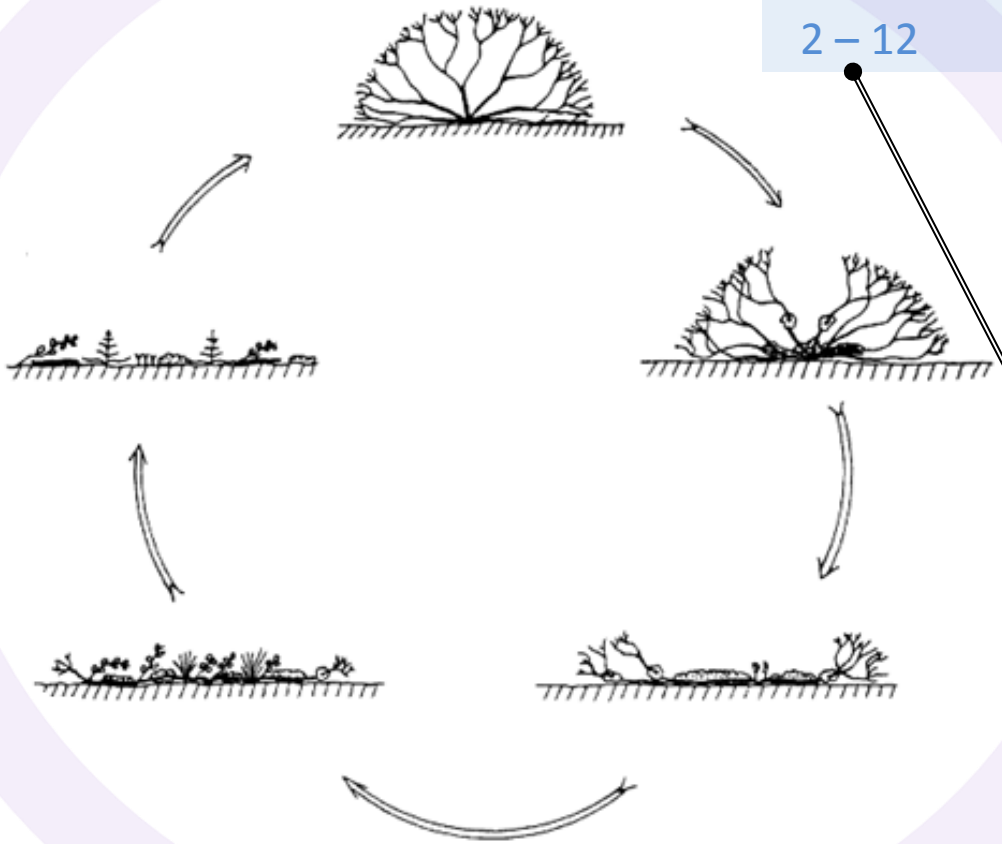
Primary cycle:
~ 8 - 15 years

Regeneration cycle:
- **resprouting**
9 - 12 years (+ x)
- **layering**
5 – 15 years (+ x)

„real life span“
19 – 25 years (1R)
20 – 30 years (2R)

No evidence for plants older than 28 years.

No evidence for more than two regeneration cycles.



Building
Layering 2 – 12
Resprouting 1 – 3

Mature
3 – 6

Degeneration
2 – 15 5 - 10

Uncertainty in deriving individual plant age from growth phase

Final conclusions

Growth phases *are a* ***good tool*** *for assessing* ***structural diversity of heathstands.***

But they are ***unvalid in prediction of individual plant age.***

Regeneration capacities are declining with individual age.

- *High vital resprouting only from young plants or young secondary regeneration*
- *Layering regeneration of older plants provides low regeneration capability*
- *Regeneration from layering can form stable, but low-vital growth stages*
- *Possibility for regrowth of Mature plants strongly decreases with regeneration cycle*

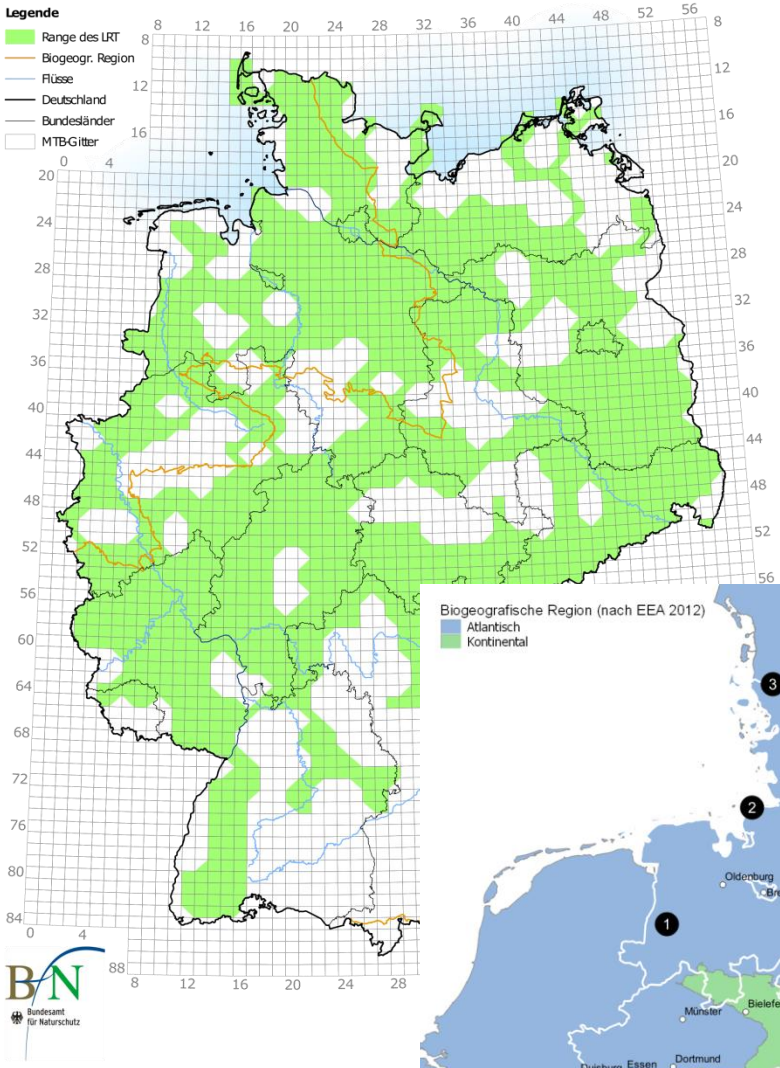
successful regeneration on a high-diversity and conservation level *needs:*

- *10-15 year intense management cycle and*
- *germination and establishment of „new“ heather plants and*
- *favourable abiotic conditions*

NATO training area, Bergen, Niedersachsen (Germany)

Habitat type 4030

Dry European heath



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Dry Sand heaths with Calluna and Genista