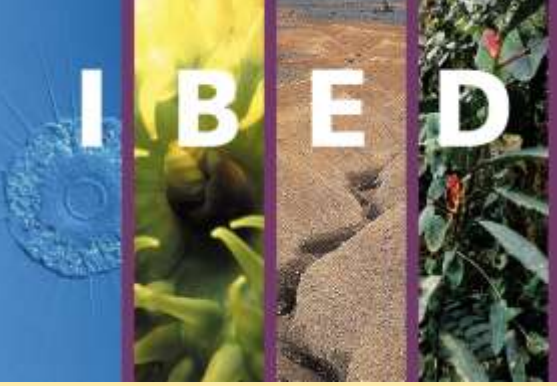


FACULTY OF SCIENCE
Institute for Biodiversity and Ecosystem Dynamics

Ontstaan van hoogvenen in Nederland in het Holoceen

Bas van Geel

B.vanGeel@uva.nl

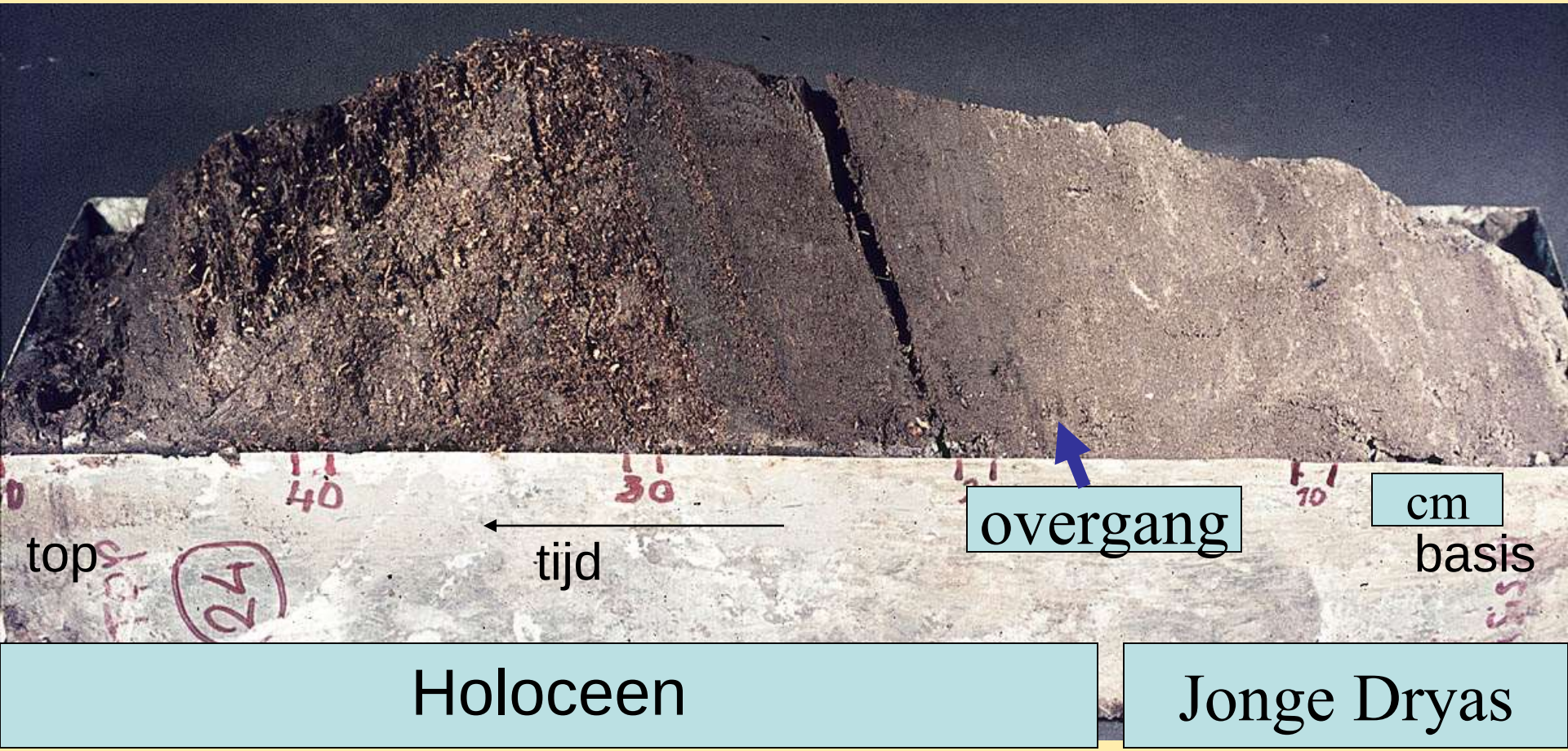
Veldwerkplaats Hydrologie van Hoogveen

Veenhuizen/Fochteloër Veen, 24 februari 2016
10.20-10.50

Borchert, bij Denekamp

Jonge Dryas - Holoceen overgang

Waarom geen veen
in de Jonge Dryas?



Een door klimaatverandering bepaalde overgang van zandige ondiepwater-afzetting naar veen:
meer organische productie bij een warmer klimaat.

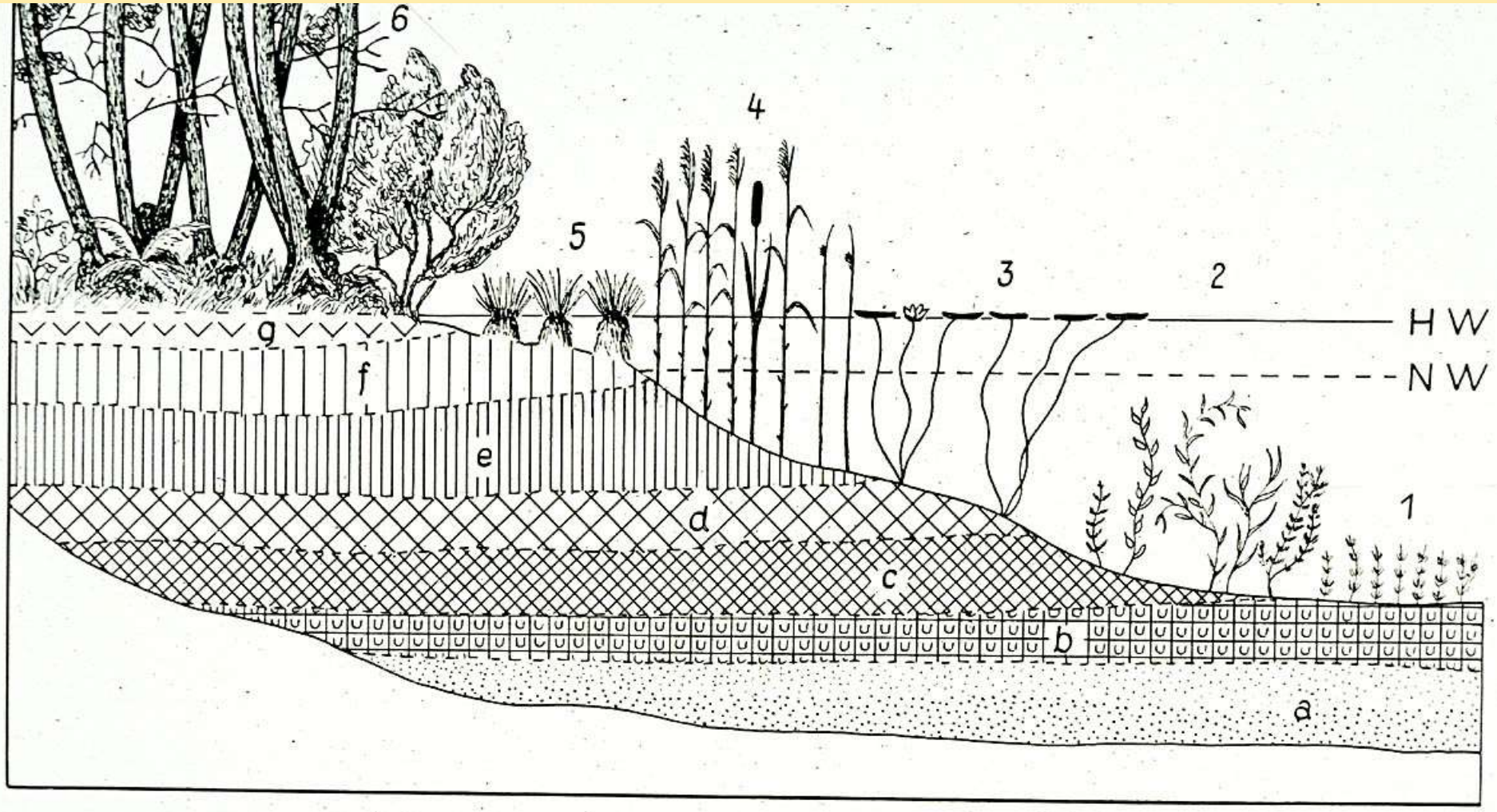
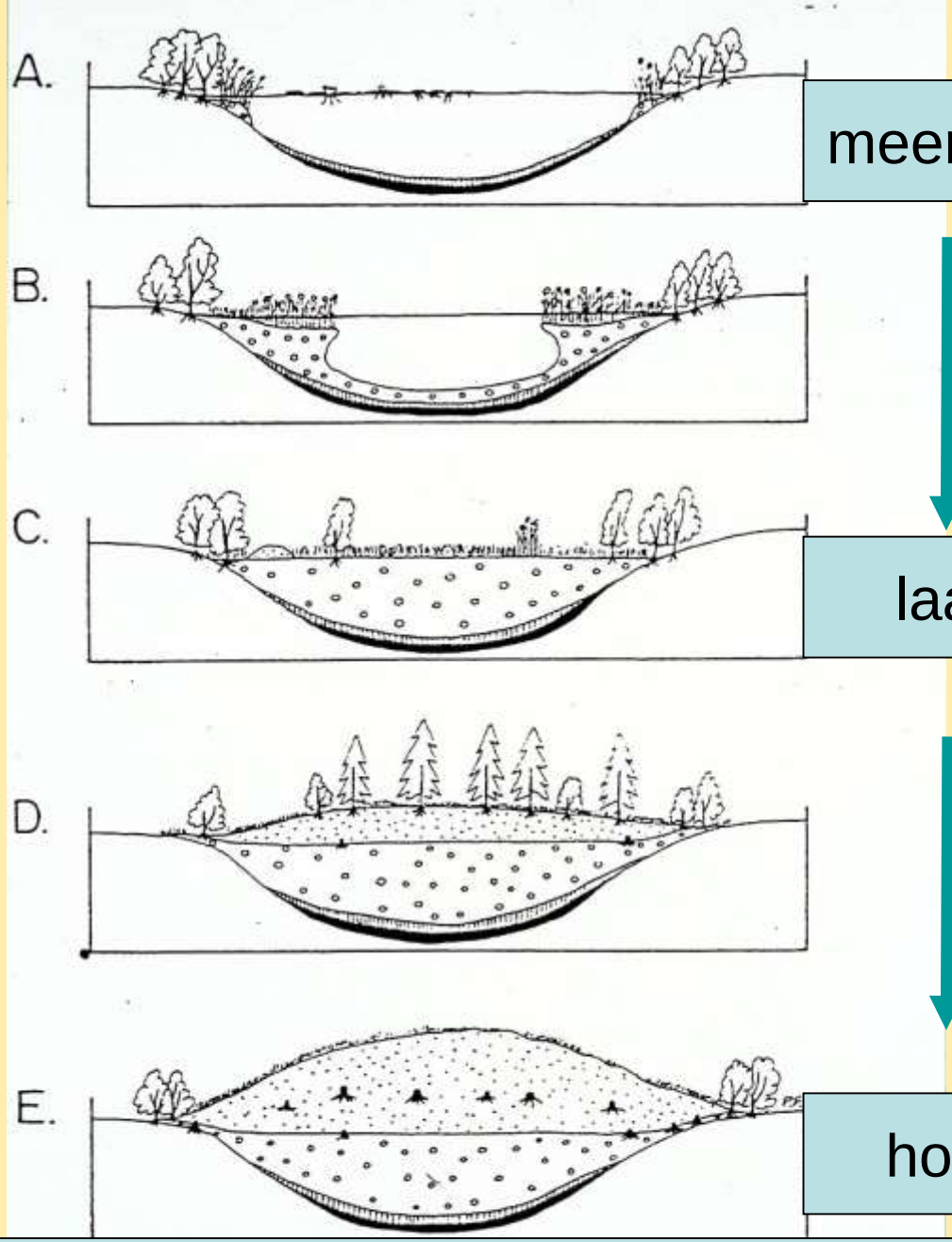


Abb. 7 Verlandungsschema eines eutrophen Gewässers. HW = Hochwassergrenze, NW = Niedrigwassergrenze; 1 = Characeen-Rasen, 2 = Laichkrautgürtel, 3 = Seerosengürtel, 4 = Röhrichtgürtel, 5 = Groß-Seggengürtel, 6 = Erlenbruchwald; a = Tonmudde, b = Kalkmudde, c = Feindetritus-Mudde, d = Grobdetritus-Mudde, e = Schilftorf, f = Seggentorf, g = Erlenbruchwaldtorf.

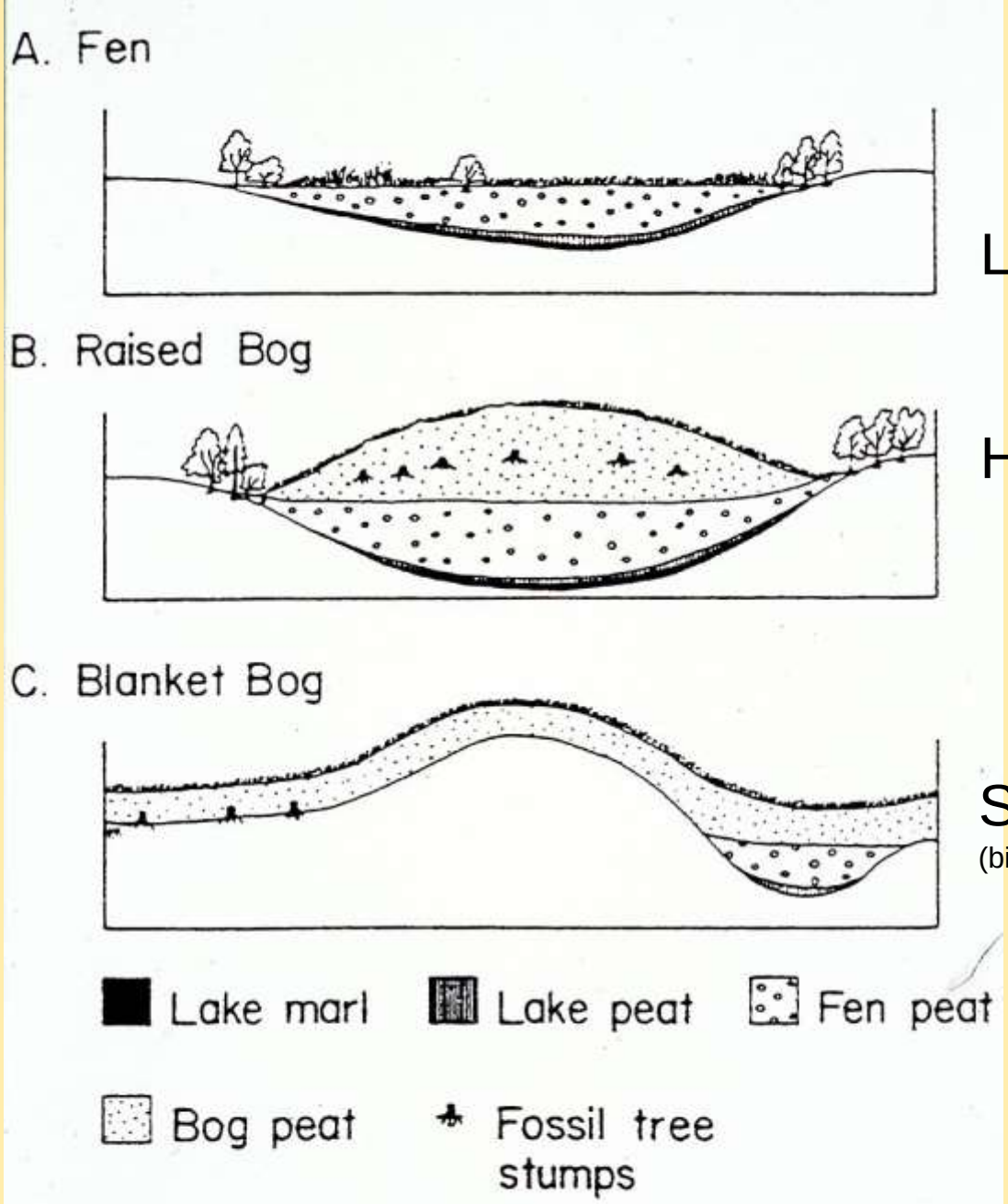


meersediment

laagveen

hoogveen

Ontwikkeling van een hoogveen: voedselarm regenwater wordt steeds belangrijker



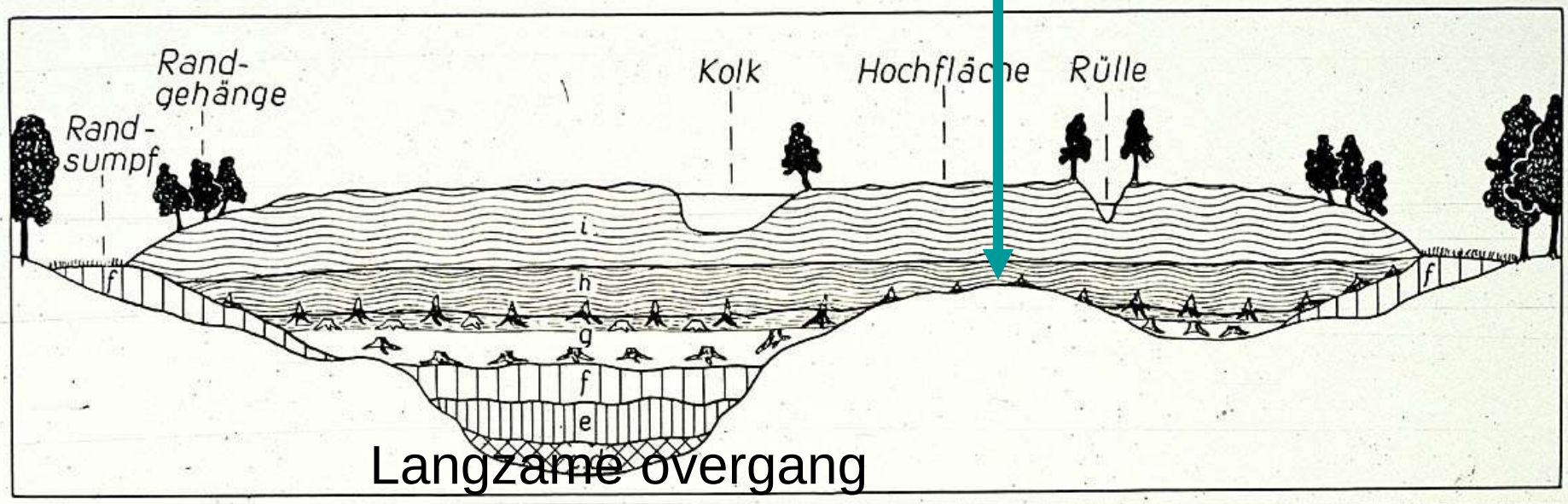
Laagveen

Hoogveen

Spreihoogveen
(bij zeer oceanisch klimaat)

laagveen en hoogveen

Zeer snelle overgang naar hoogveen

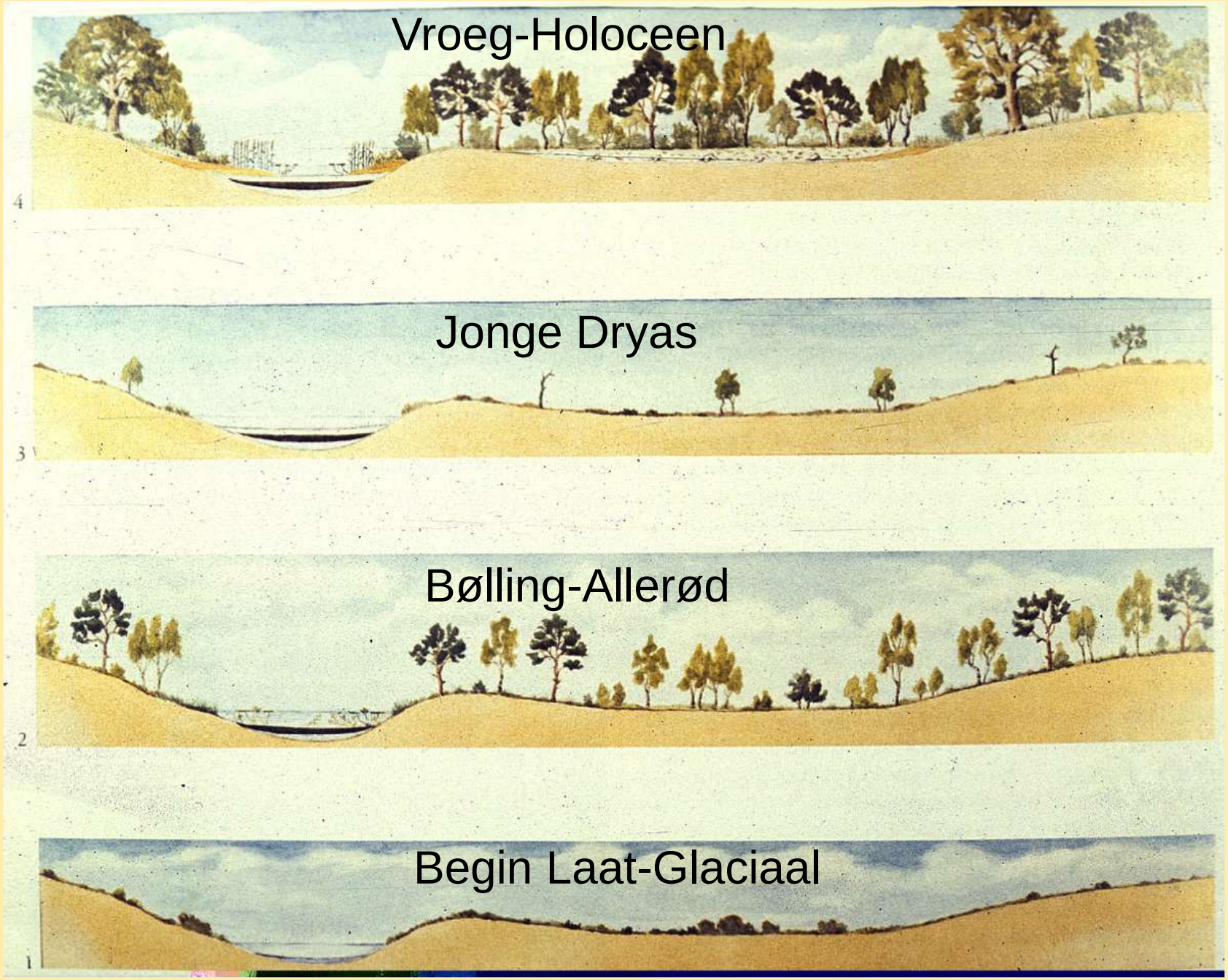


Langzame overgang

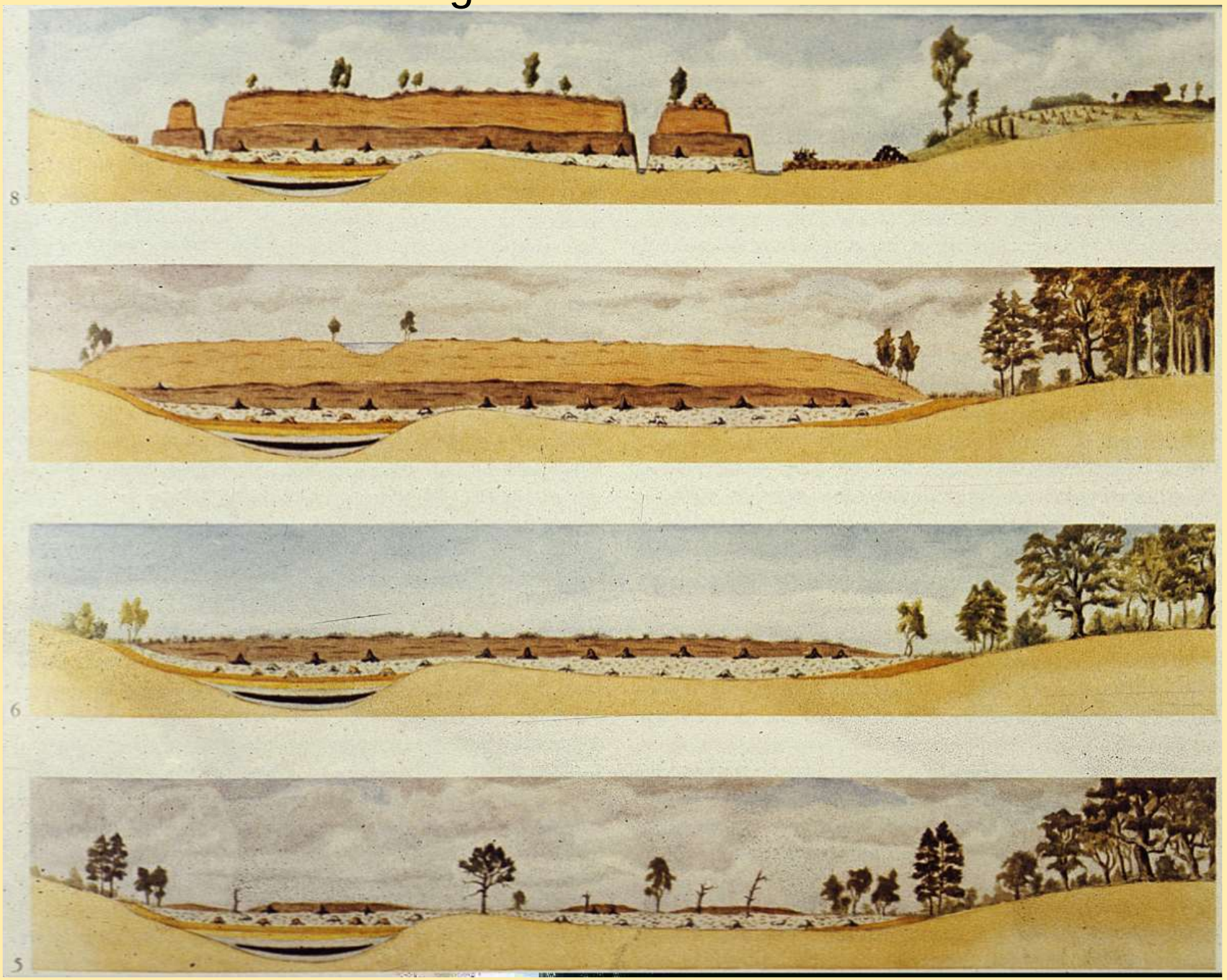
Abb. 9 Schematischer Schnitt durch ein echtes Hochmoor, das sich über Flachmoorablagerungen aufgebaut hat. c, d = Mudden (siehe Abb. 7); e = Schilftorf, f = Seggentorf, g = Erlenbruchtorf, darüber Birken-Kiefern-Übergangswaldtorf, h = stark zersetzter Sphagnumtorf, i = schwach zersetzter Sphagnumtorf.

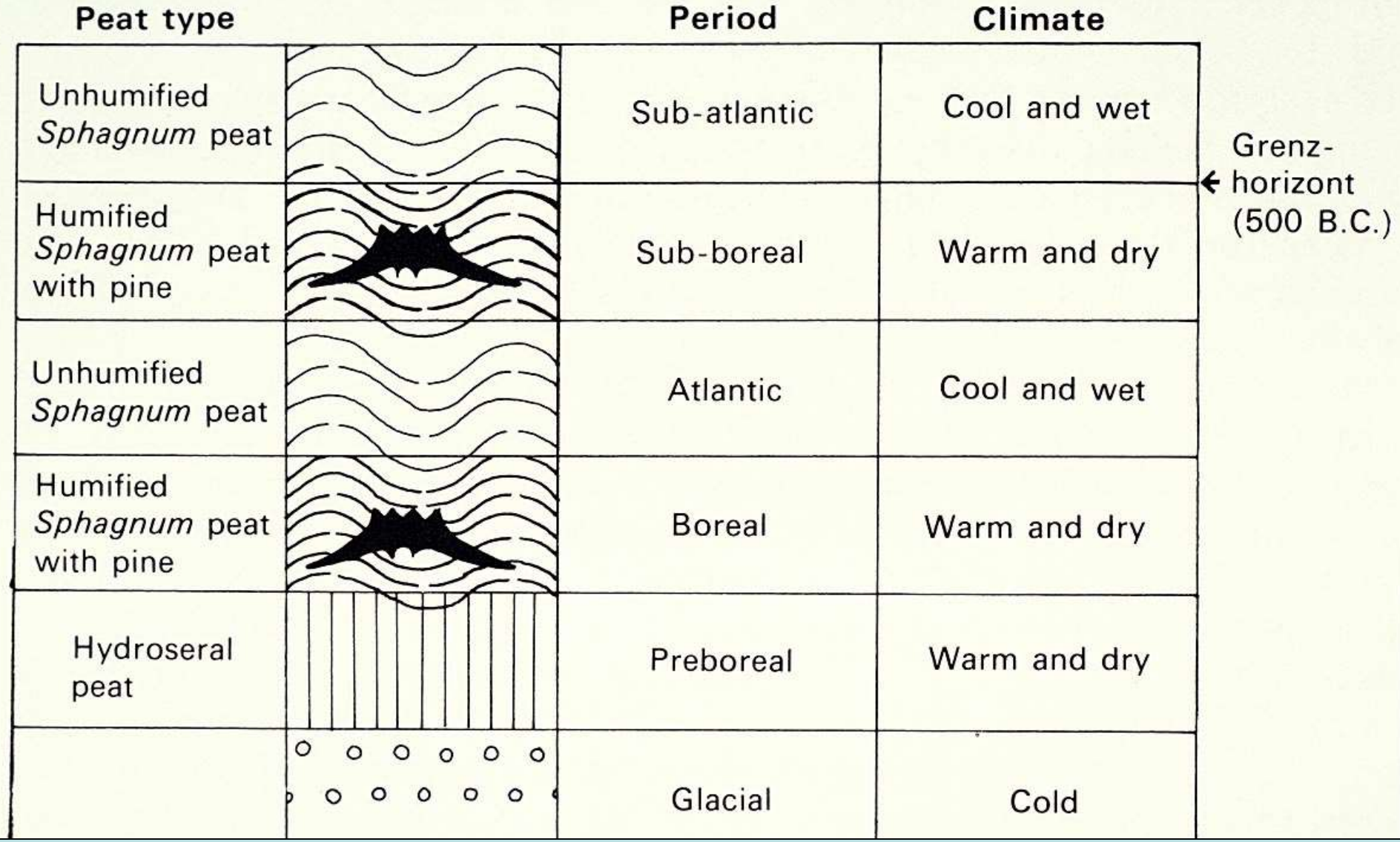
De stadia voorafgaand aan de hoogveenvorming zijn verschillend per locatie binnen het moeras.

Klimaat en minerale bodems veranderen in de loop v.h. Holoceen.

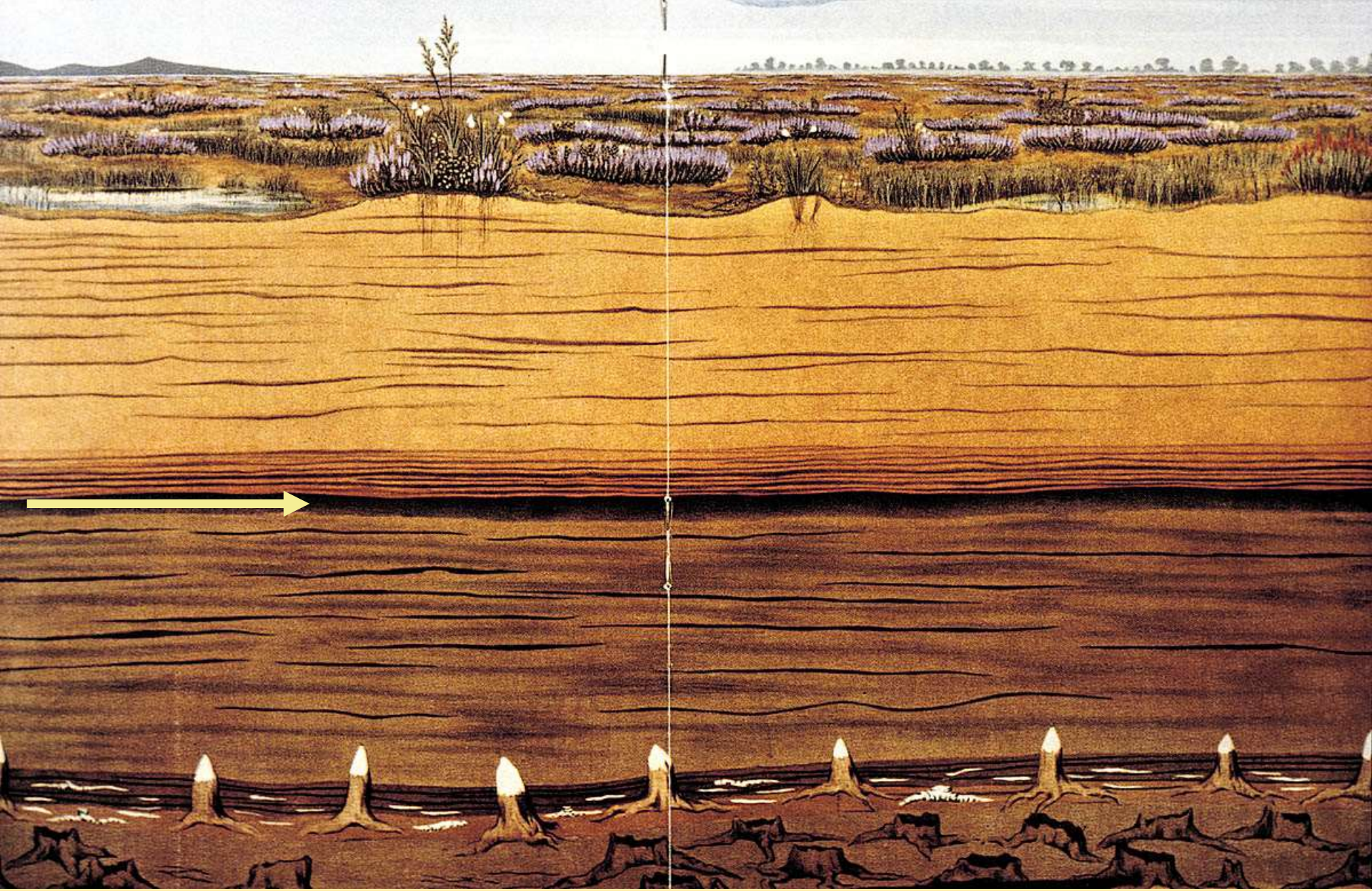

Vroeg-Holoceen
4
Jonge Dryas
3
Bølling-Allerød
2
Begin Laat-Glaciaal
1

Ontwikkeling in het Holoceen

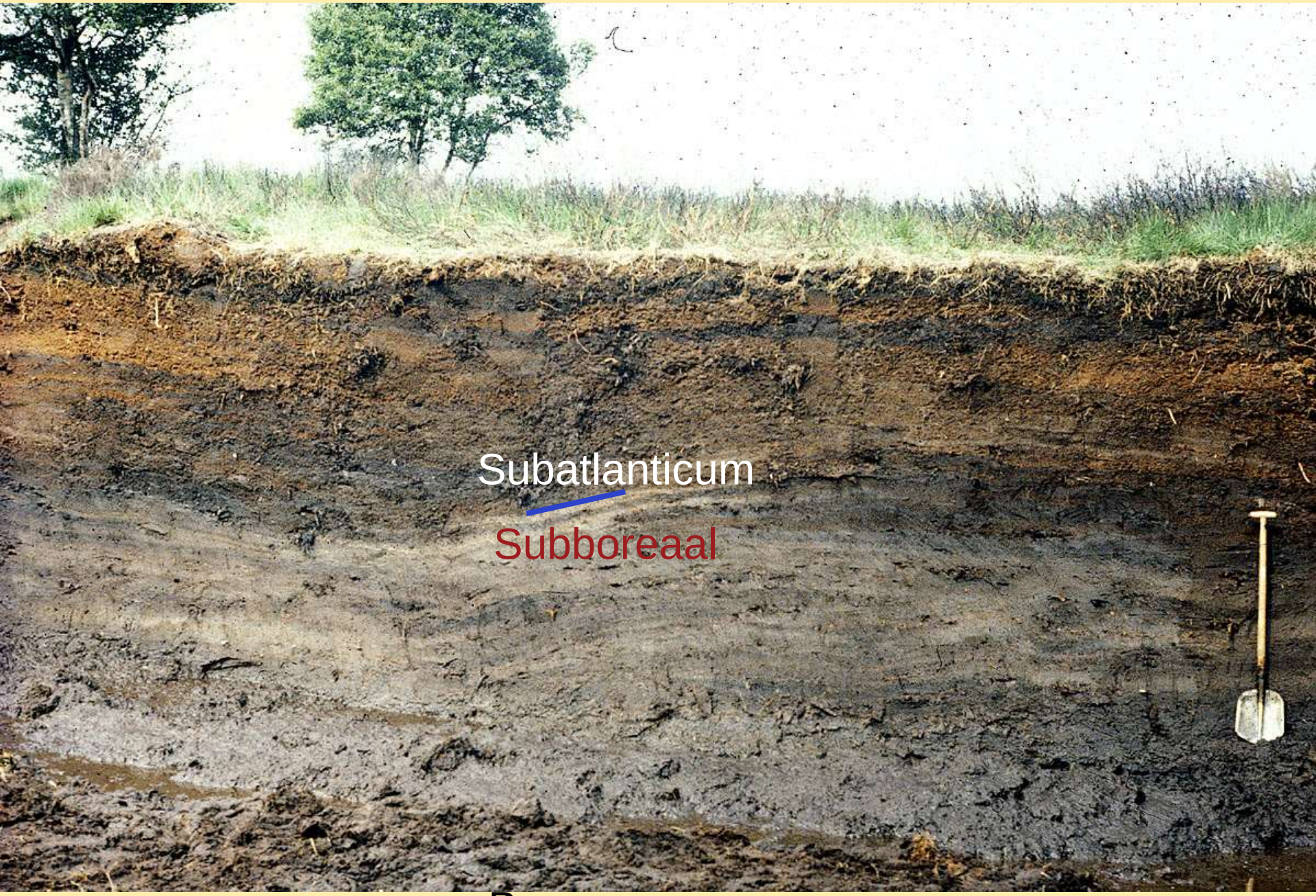




Blytt-Sernander schema: klimaat-ontwikkeling tijdens Holoceen
Weinig vergaan hoogveen in natte, koele perioden

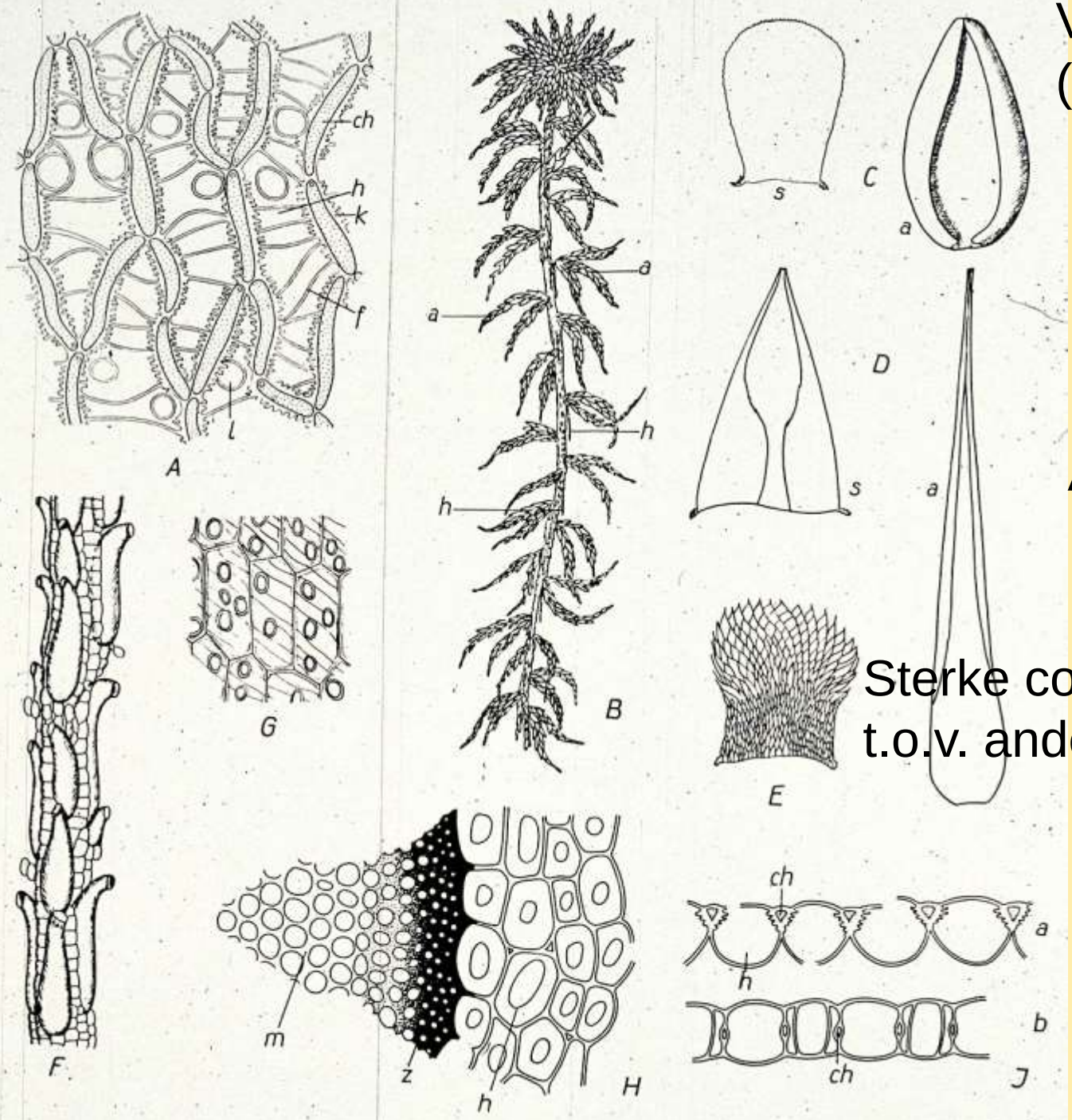


“Grenshorizont van Weber”



Bargerveen

Monstername
Bargerveen
met Wil Casparie
en
Dirk van Smeerdijk



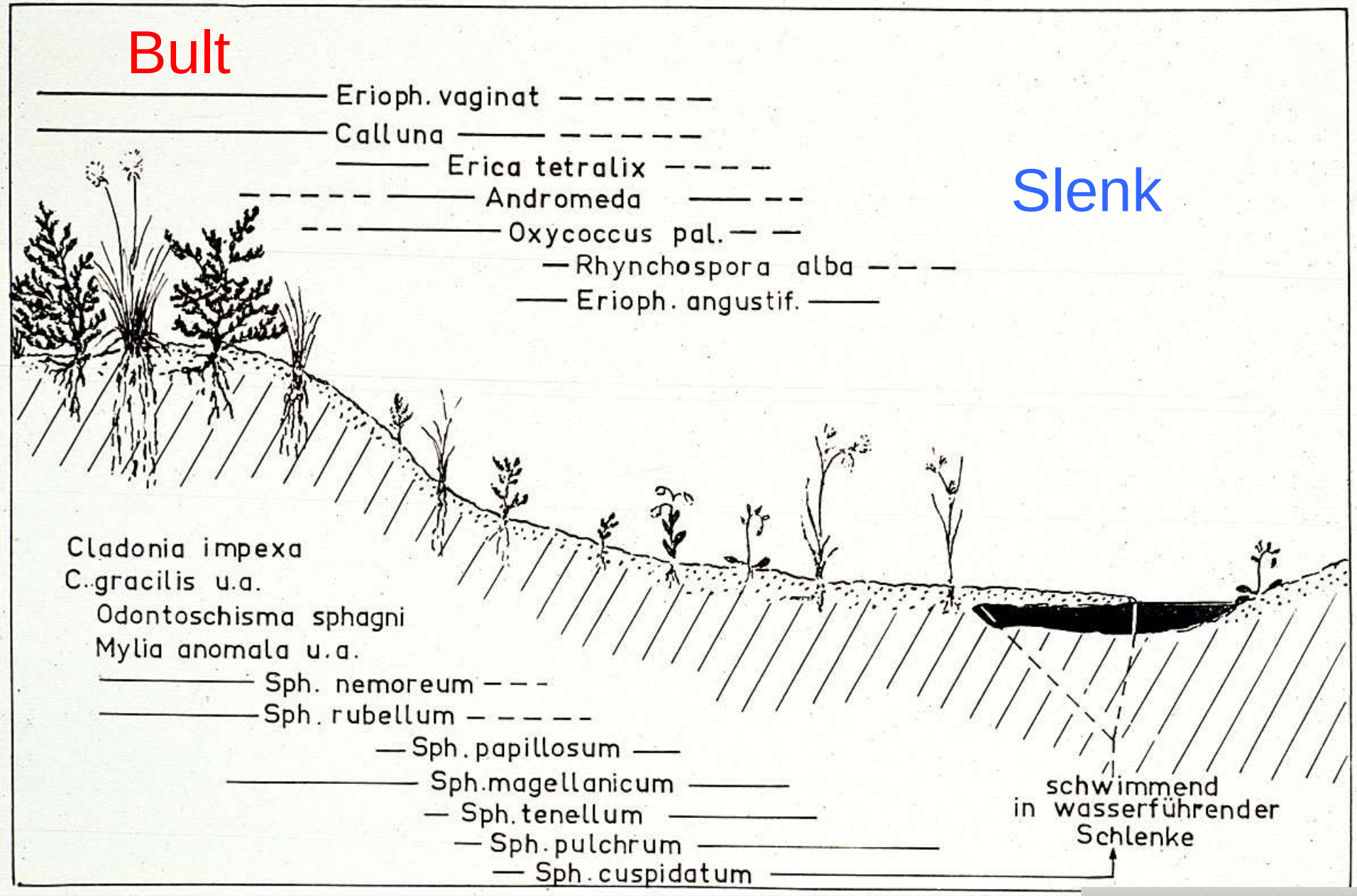
Veenmossen
(*Sphagnum* soorten)

Sponswerking

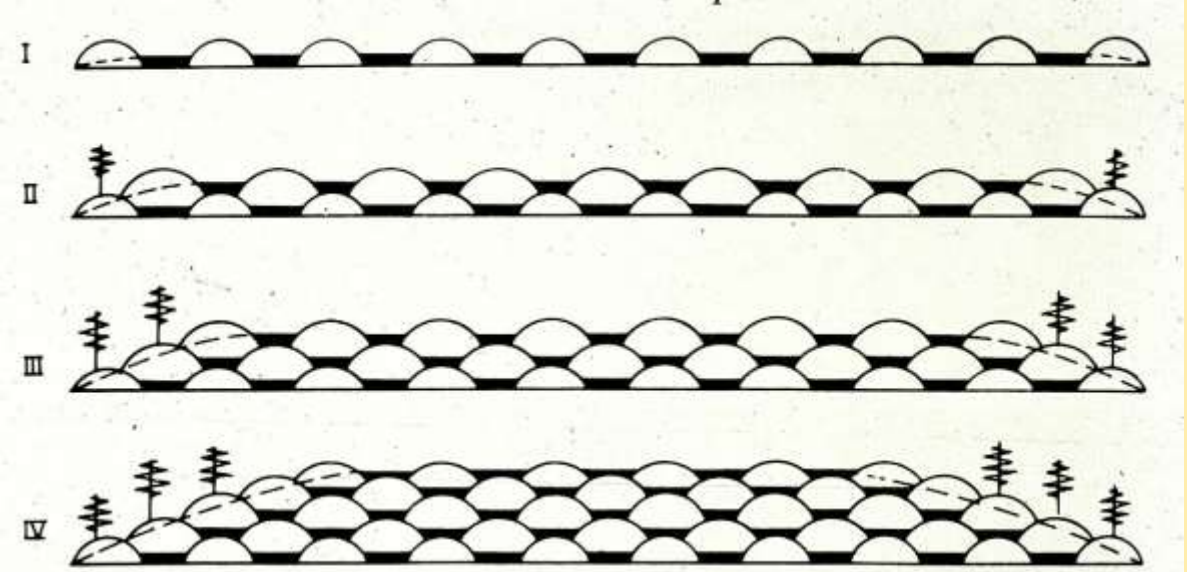
Actieve verzuring

Sterke concurrentiepositie
t.o.v. andere moerasplanten

Neerslagoverschot
essentieel voor
hoogveenvorming



We gebruiken de ecologie van soorten voor de hydrologische reconstructies



A diagram to illustrate one possible scheme of upward growth by a raised-bog, by the alternating development of pools and hummocks. The black shading indicates the wet pools, with *Sphagnum cuspidatum*, and the arcs represent the hummocks, with *S. fuscum* and *imbricatum*. The broken line indicates the water-table, and shows the way it rises as the bog grows upwards. (Redrawn by P. D. Moore and D. J. Bellamy after S. Kulczynski).

Verkeerd model voor hoogveengroei

'**Cyclische** regeneratie' (Osvald, 1923)

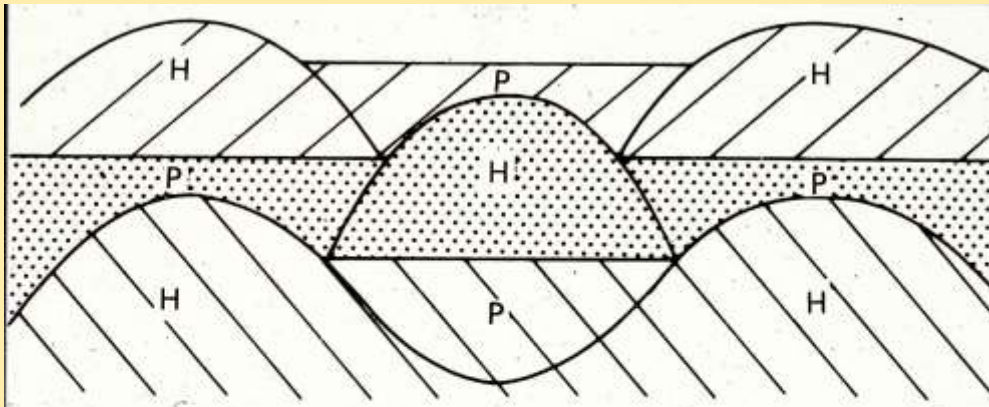
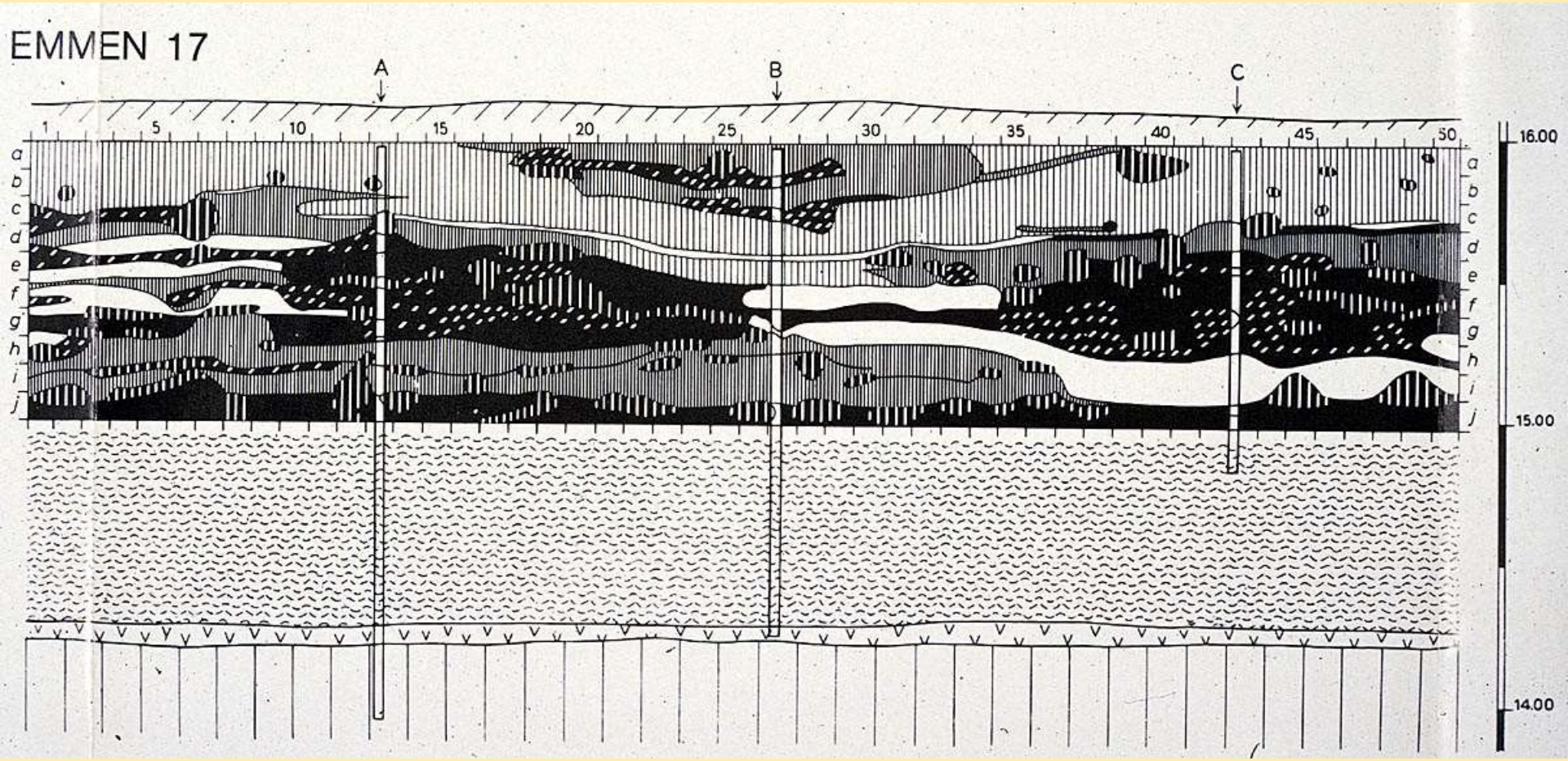
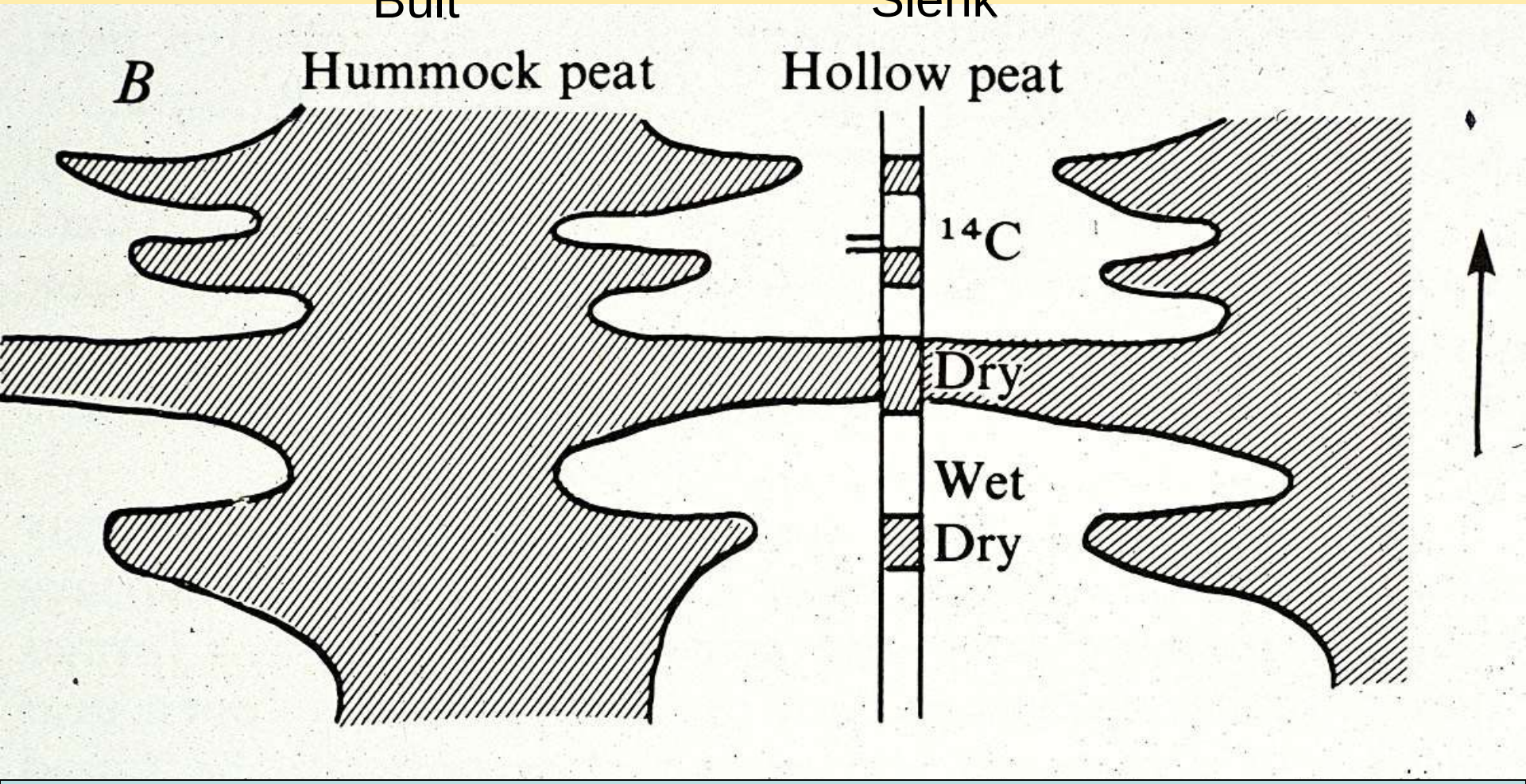


Fig. 4.14 Theoretical stratigraphic section through a pool and hummock complex on a raised bog, showing how each generation originates from pools of the previous generation.

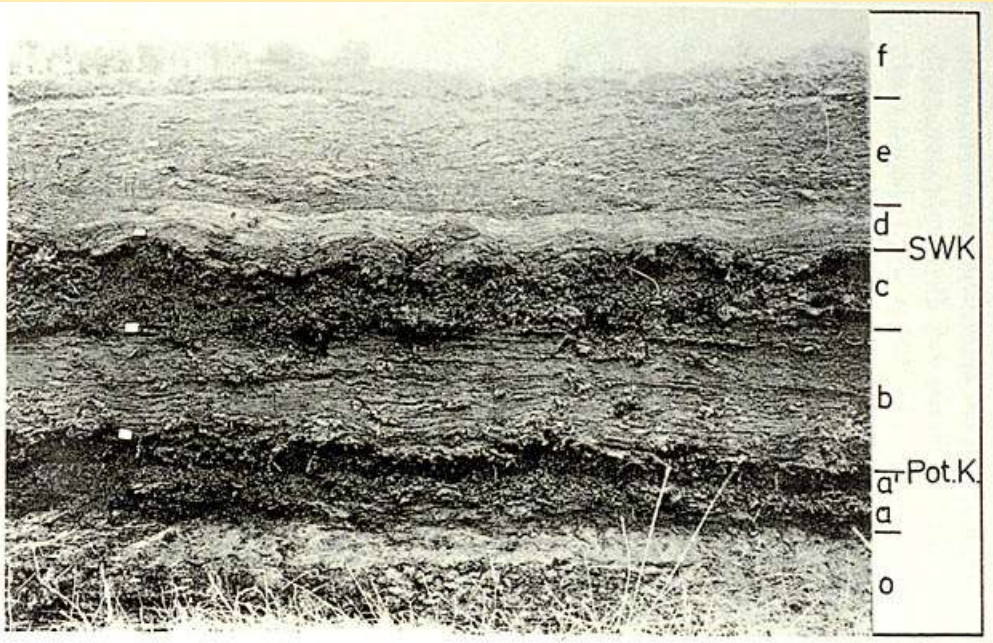
Een van Casparie's profielen in ZO-Drenthe

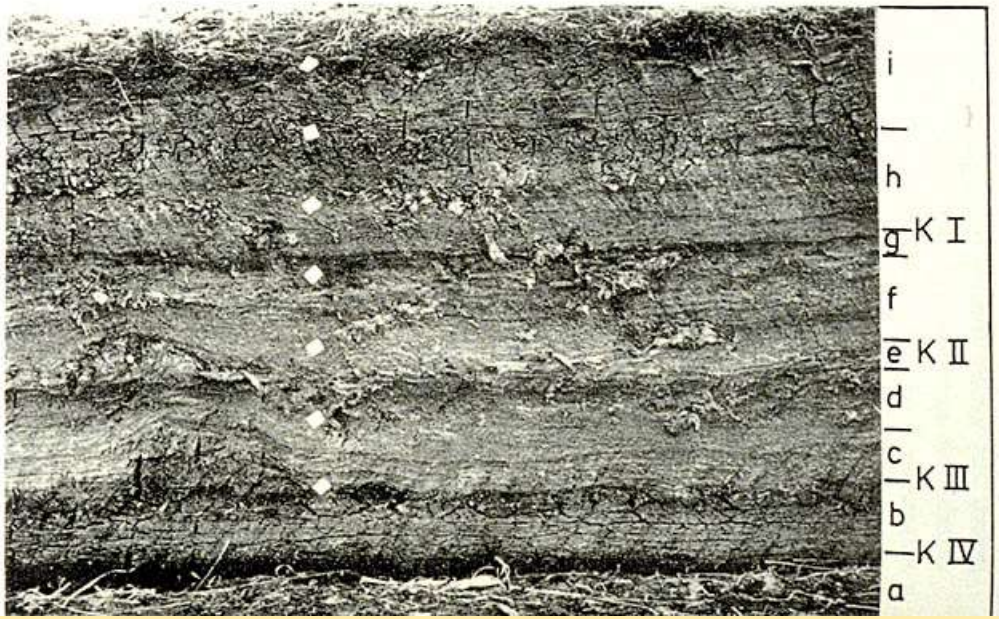


Bult Slenk

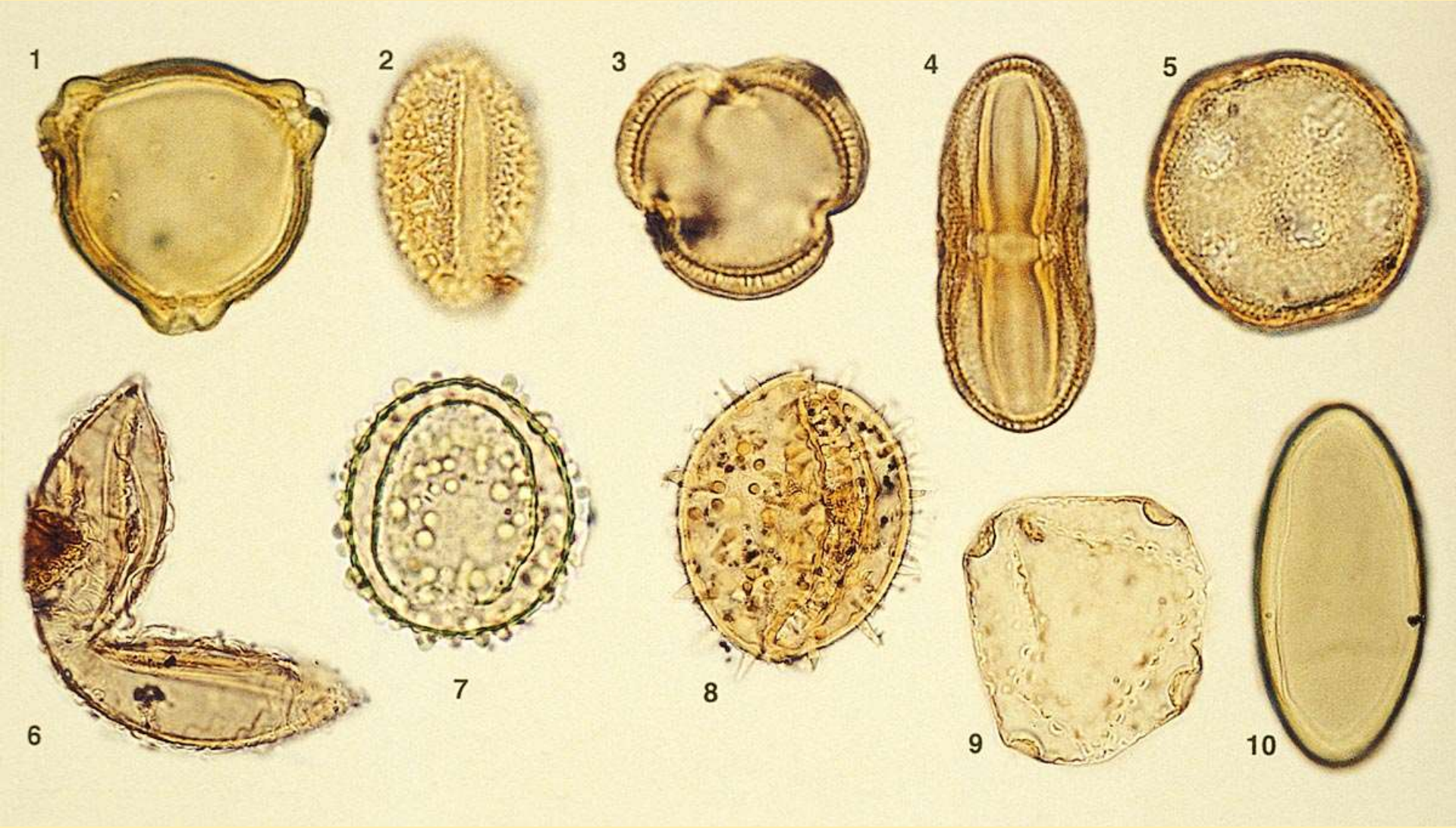


Theoretisch hoogveenprofiel; bultvegetatie breidt zich uit in droge perioden en de bulten worden kleiner tijdens nattere perioden



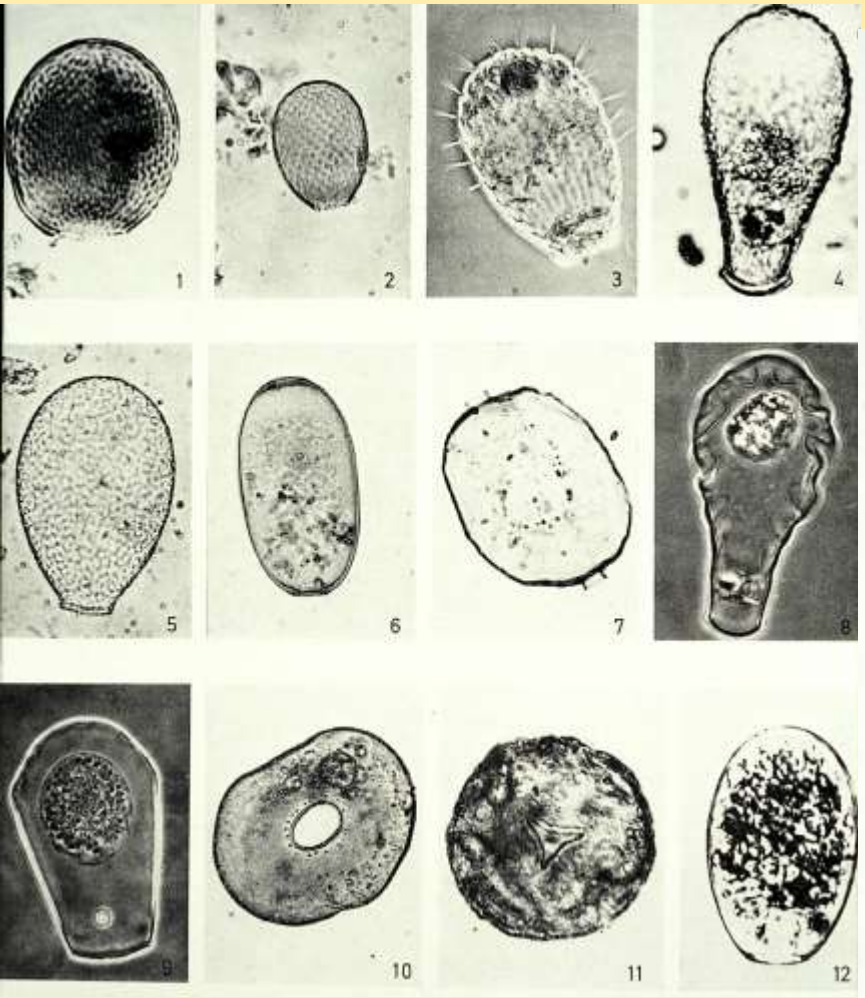


Donker veen: droge fase. Lichtgekleurd veen: natte fase



Stuifmeel en andere microfossielen

Testate amoeben (“Rhizopoden”)



testate amoeben

droog nat

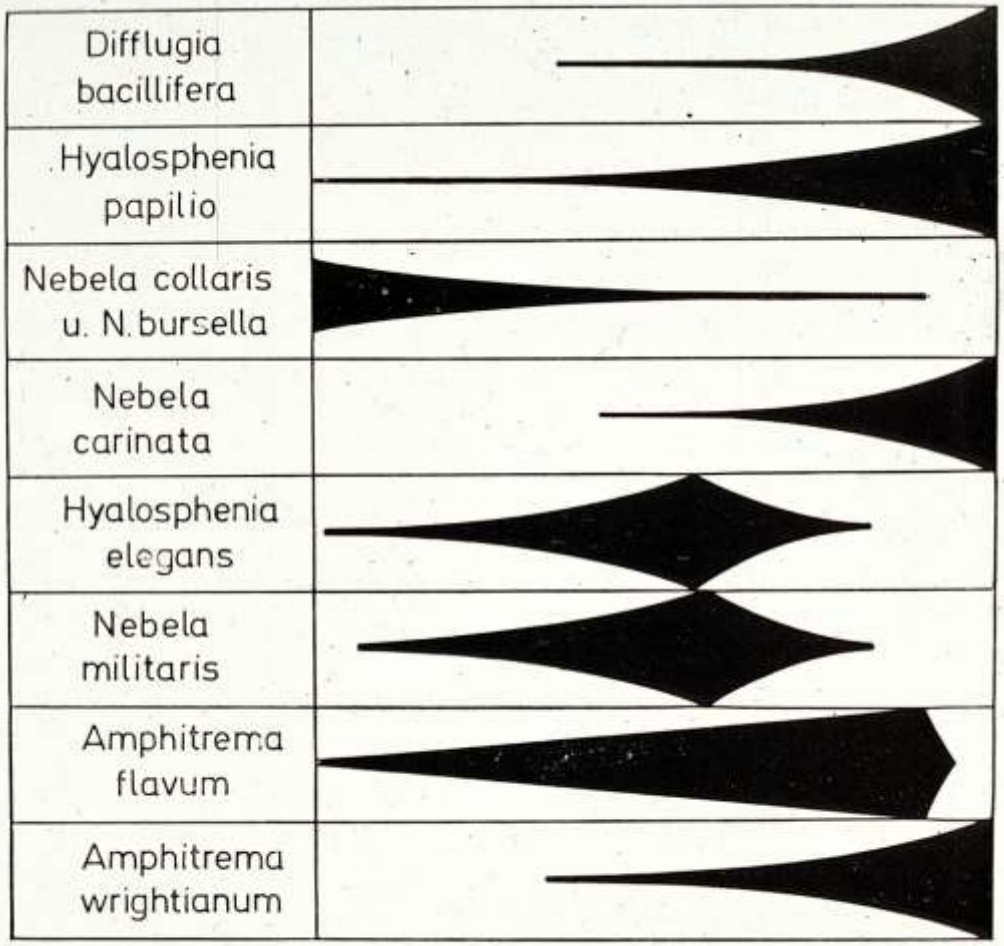
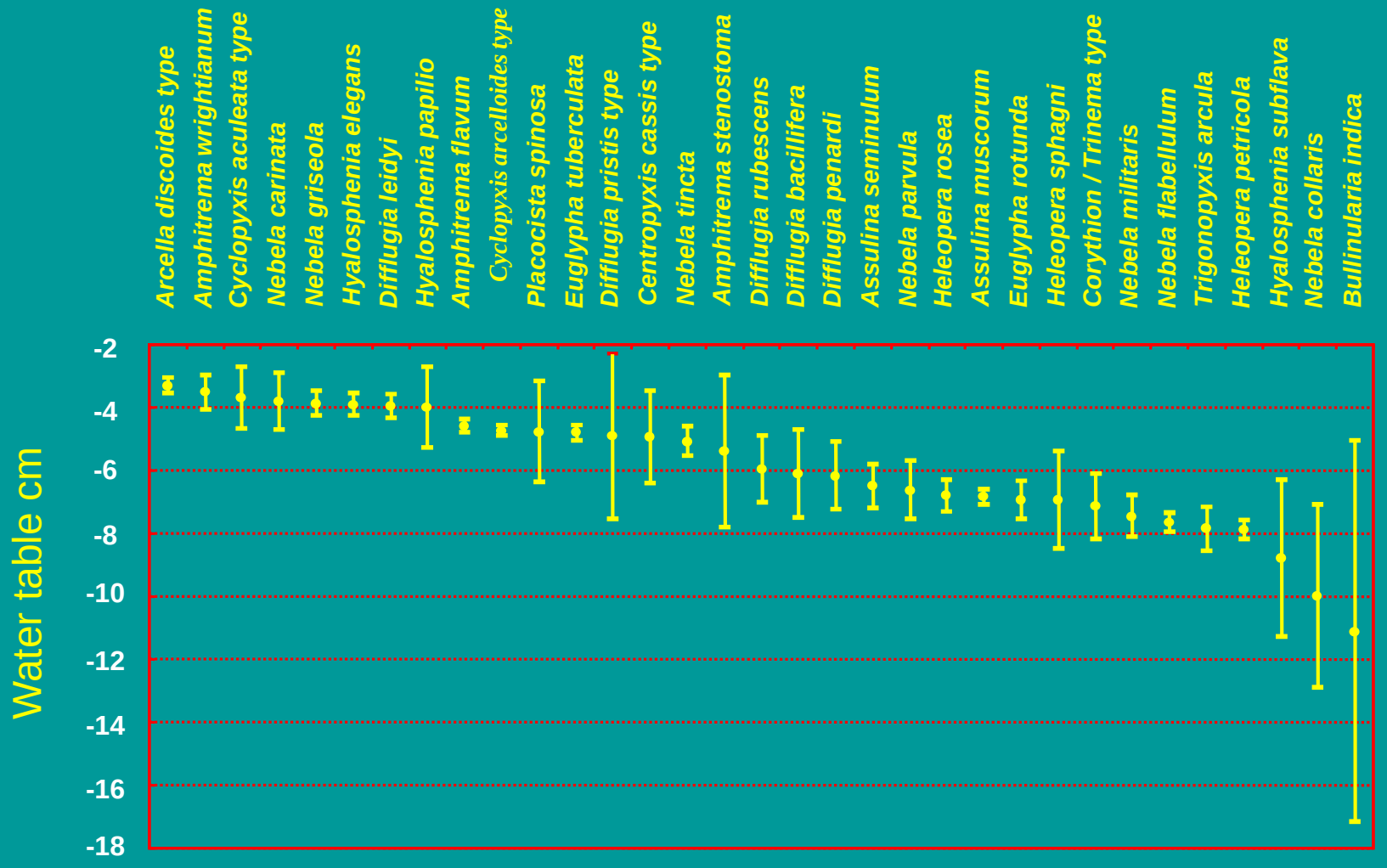
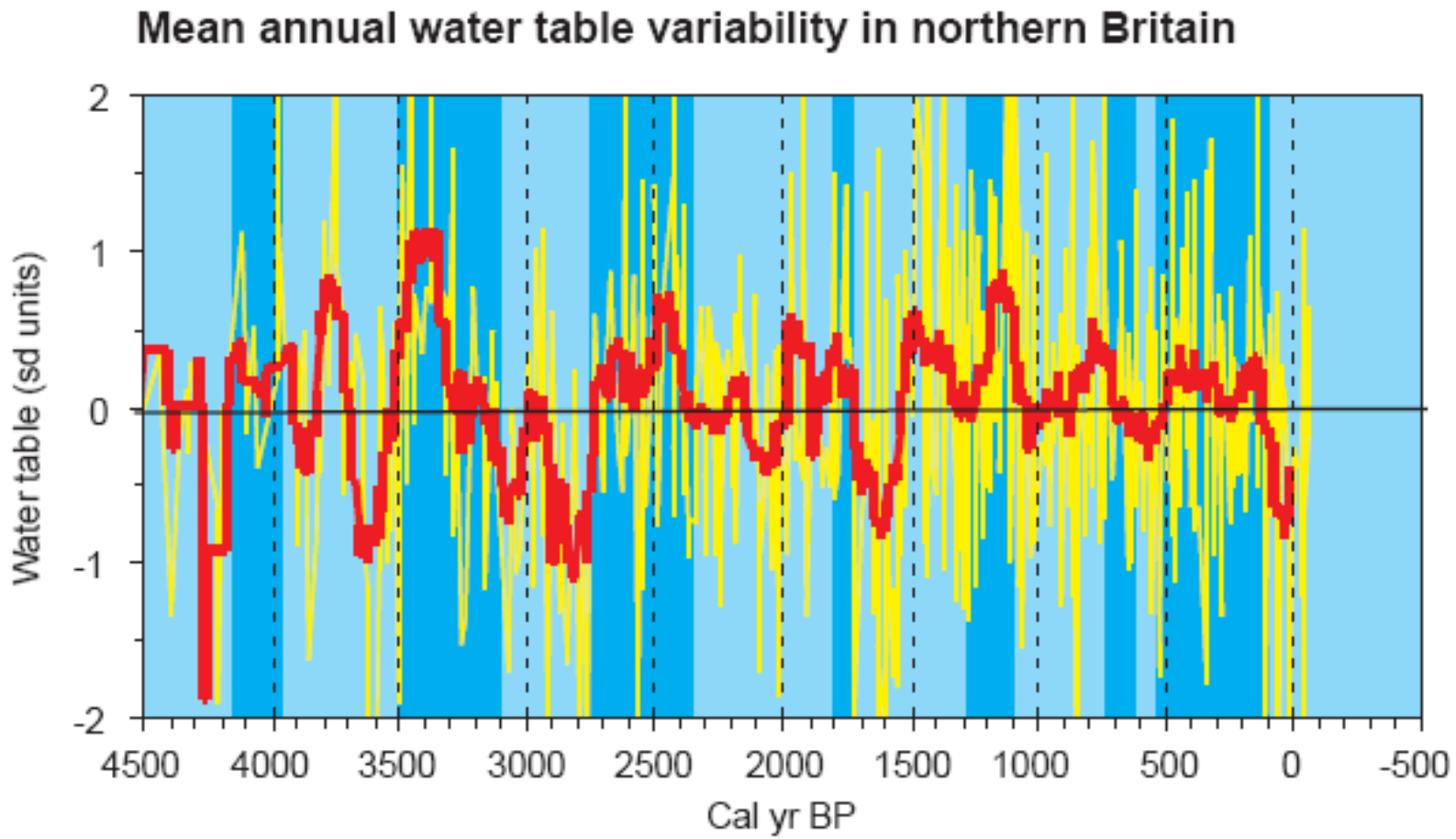


Abb. 239 Häufigkeit einiger Rhizopodenarten im Sphagnumrasen (nach HARNISCH).

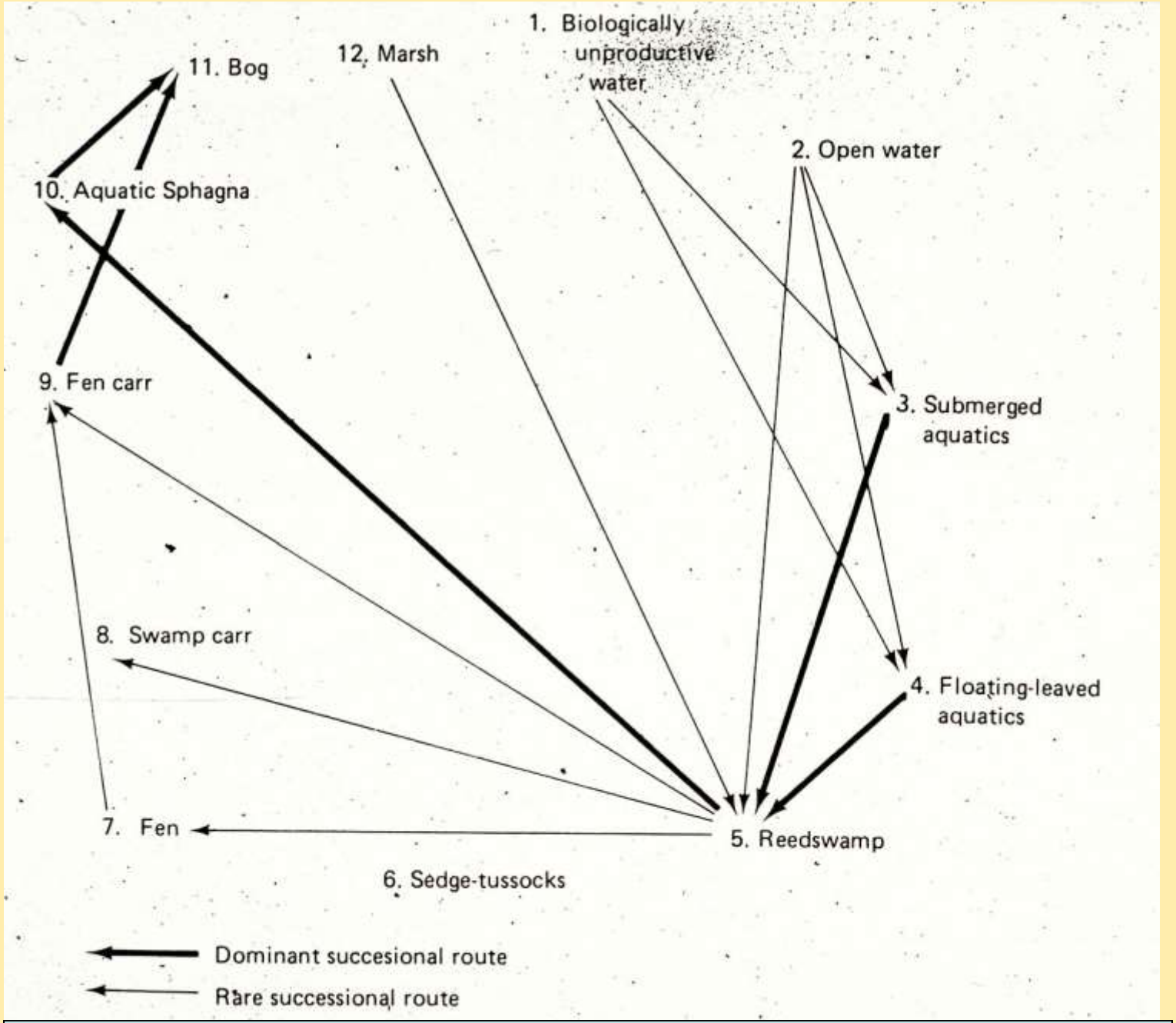
Hydrological niches of testate amoebae in present



Woodland et al. (1998) The Holocene, 8, 261-273



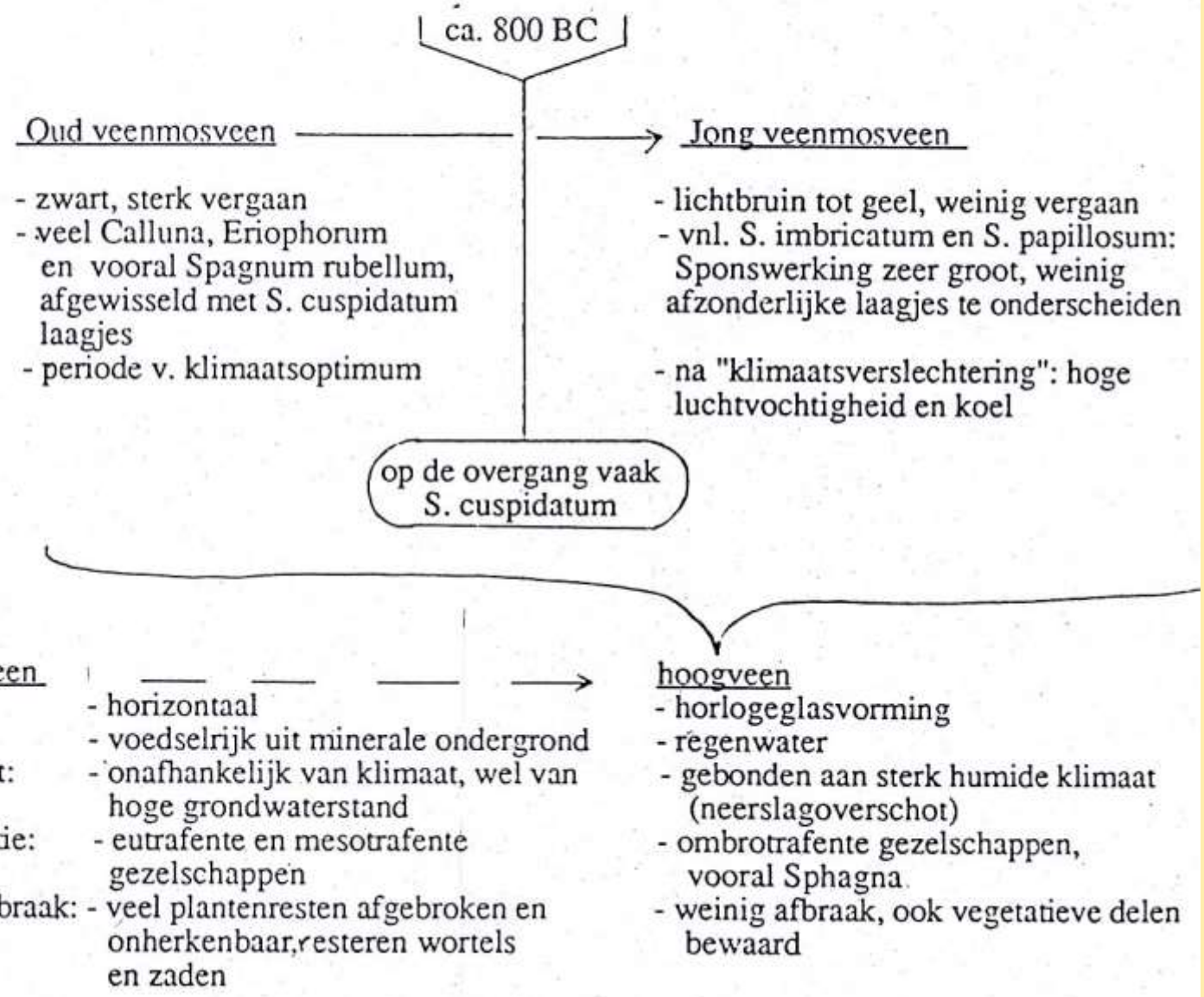
Twelve stacked water table records (Charman et al, 2006, QSR). Dark blue shading - phases of higher lake levels in Europe (Magny, 2004).



Transitions between vegetational stages as recorded in 159 mire sites in the British Isles (Walker 1970)

Laagveen	——— ——— ——— ⟶	hoogveen
vorm:	- horizontaal	- horlogeglasvorming
water:	- voedselrijk uit minerale ondergrond	- regenwater
klimaat:	- onafhankelijk van klimaat, wel van hoge grondwaterstand	- gebonden aan sterk humide klimaat (neerslagoverschot)
vegetatie:	- eutrafente en mesotrafente gezelschappen	- ombrotrafente gezelschappen, vooral Sphagna
veenafbraak:	- veel plantenresten afgebroken en onherkenbaar,resteren wortels en zaden	- weinig afbraak, ook vegetatieve delen bewaard

Laagveen en Hoogveen, enige kenmerken



Sphagnum-veen

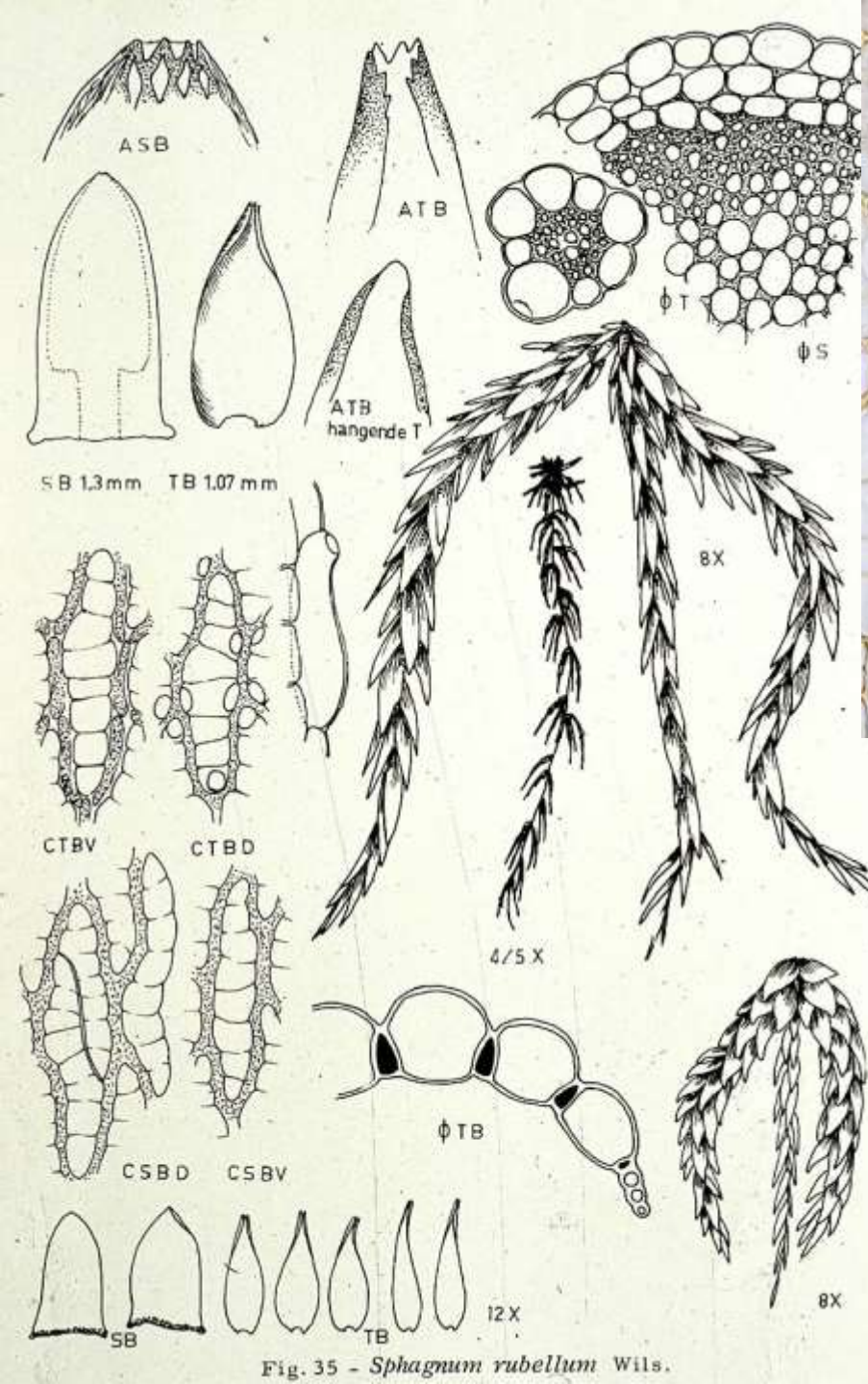
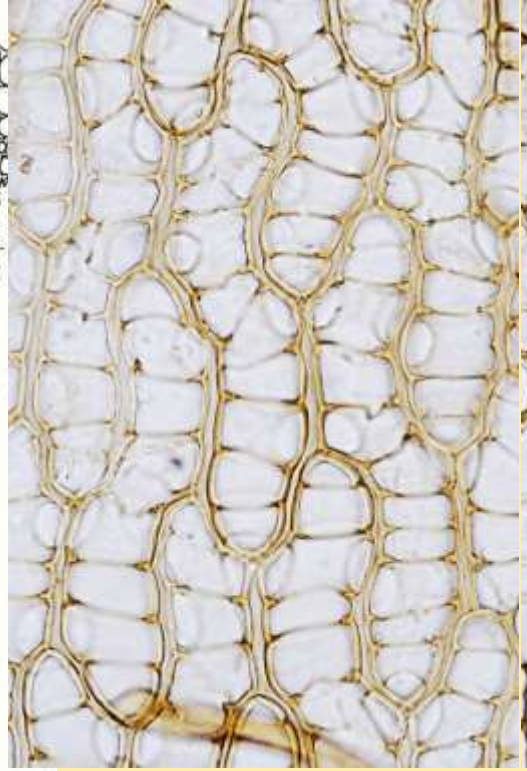
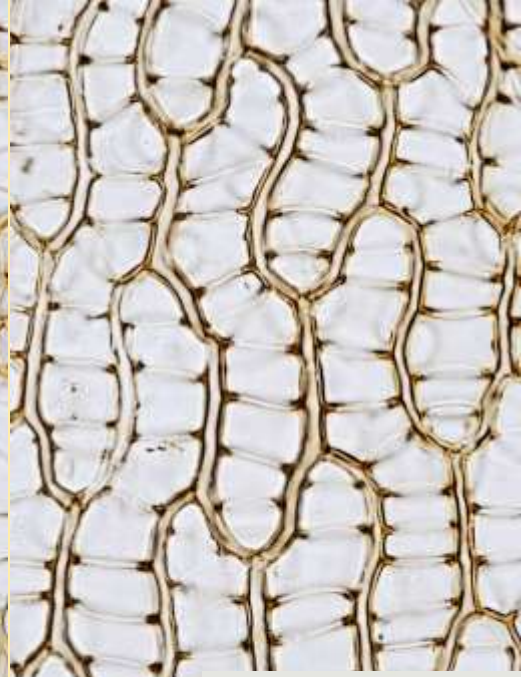


Fig. 35 - *Sphagnum rubellum* Wils.





Sphagnum rubellum
(S. sect. Acutifolia)

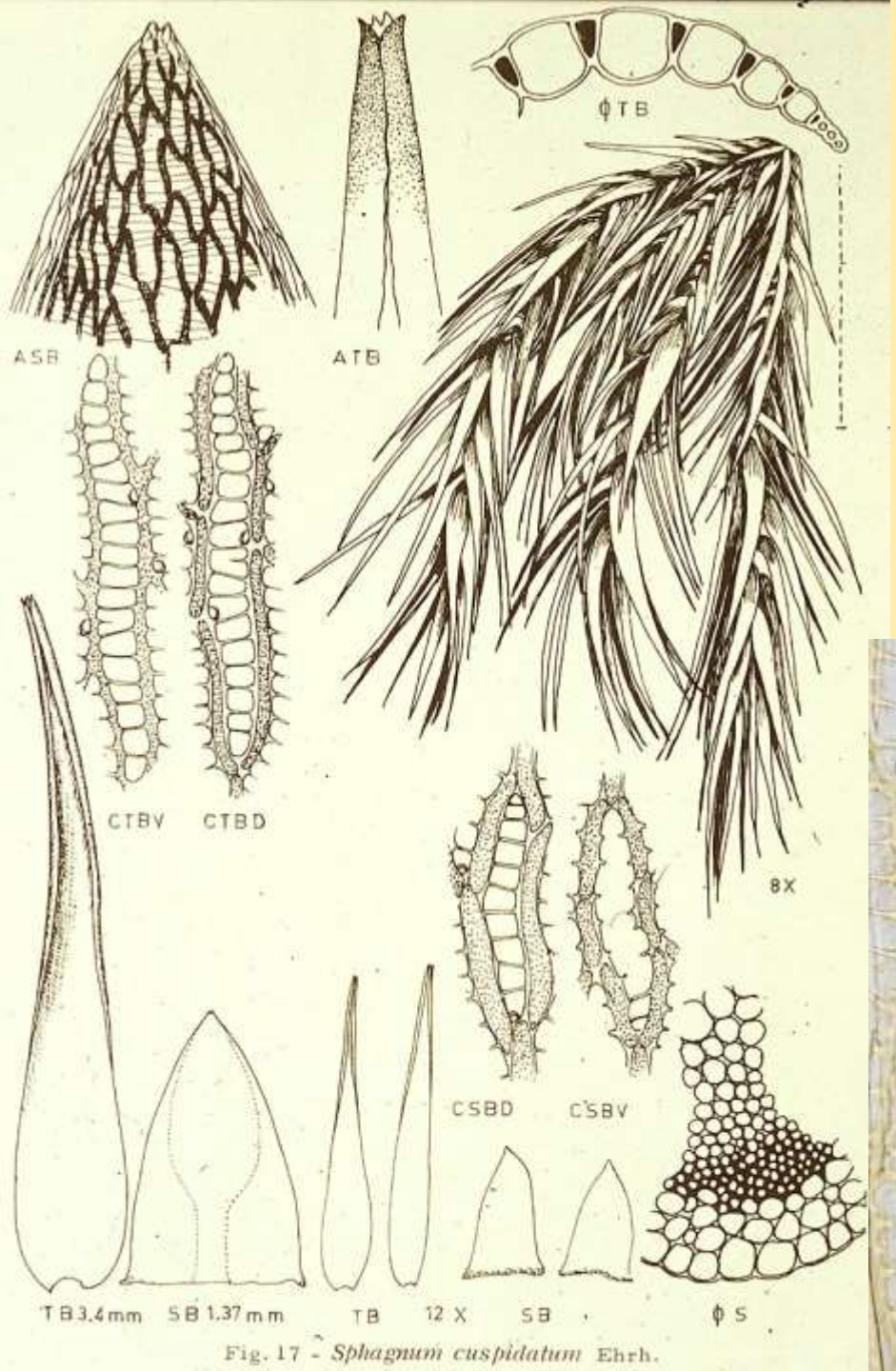
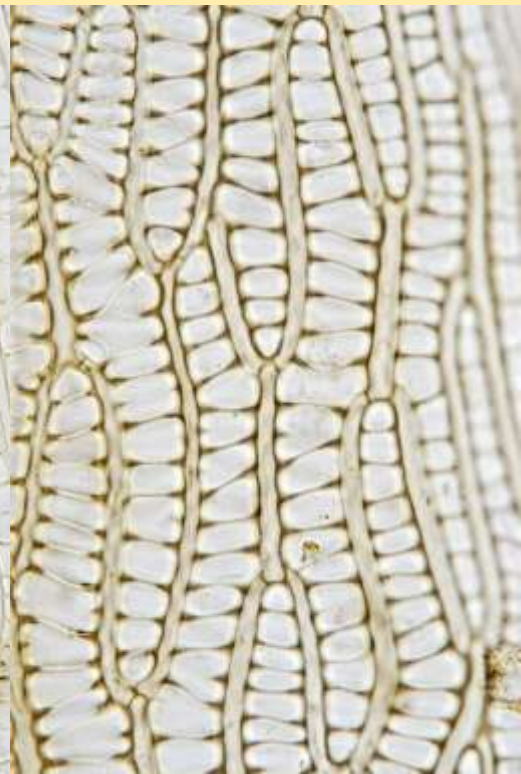


Fig. 17 - *Sphagnum cuspidatum* Ehrh.

Sphagnum cuspidatum



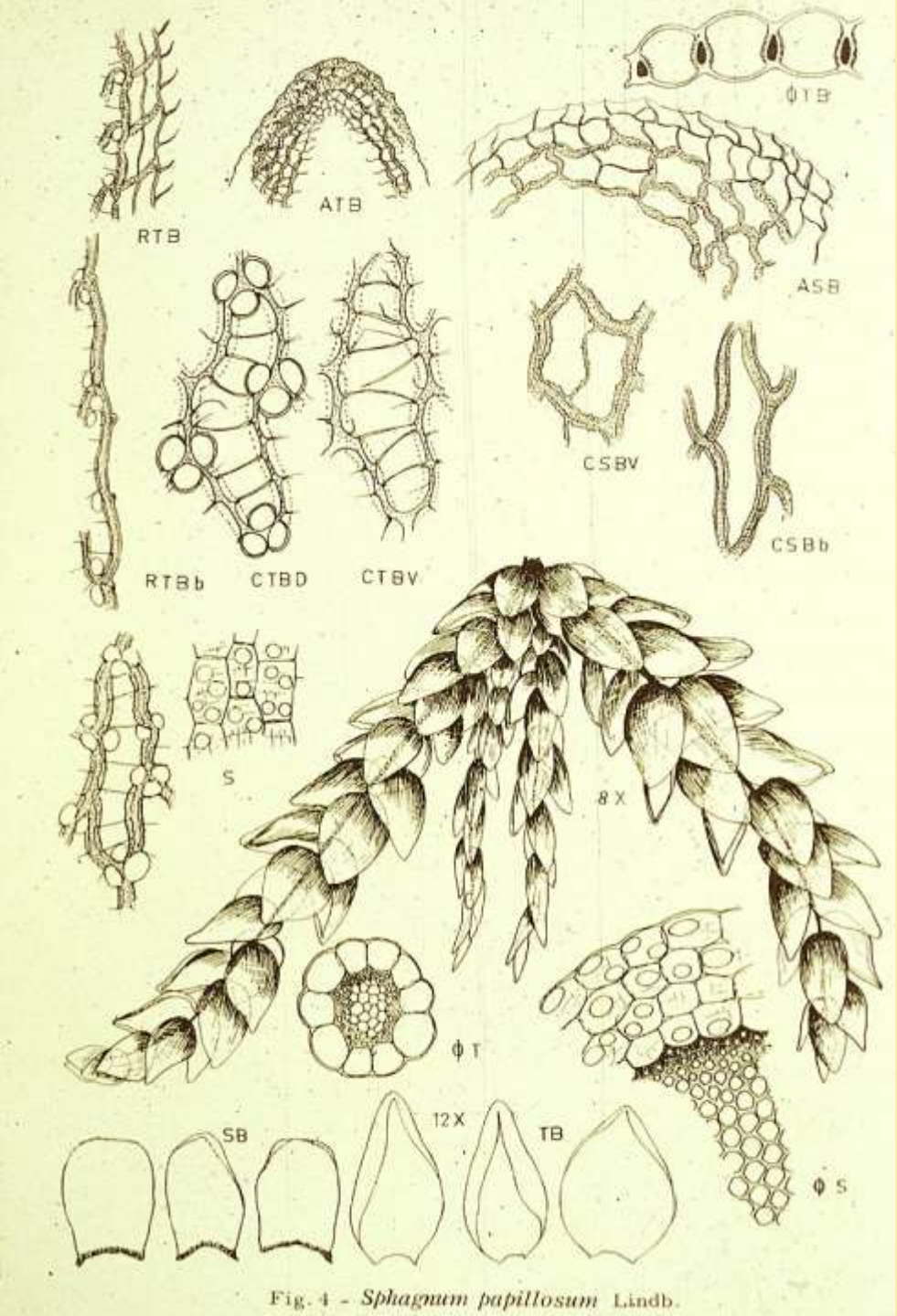


Fig. 4 - *Sphagnum papillosum* Lindb.

Sphagnum papillosum

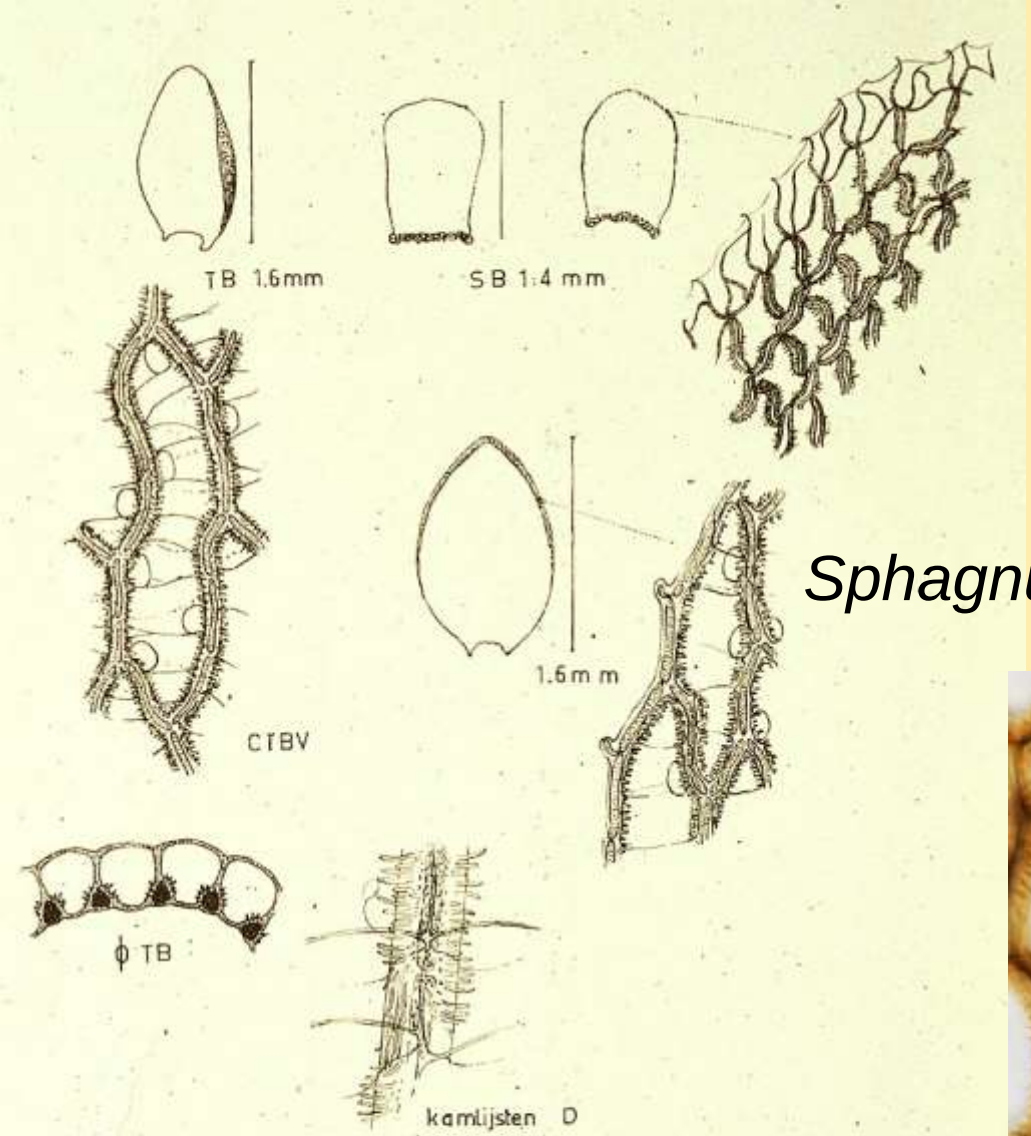


Fig. 5 - *Sphagnum imbricatum* Hornsch. (naar subfossiel materiaal)

Sphagnum imbricatum

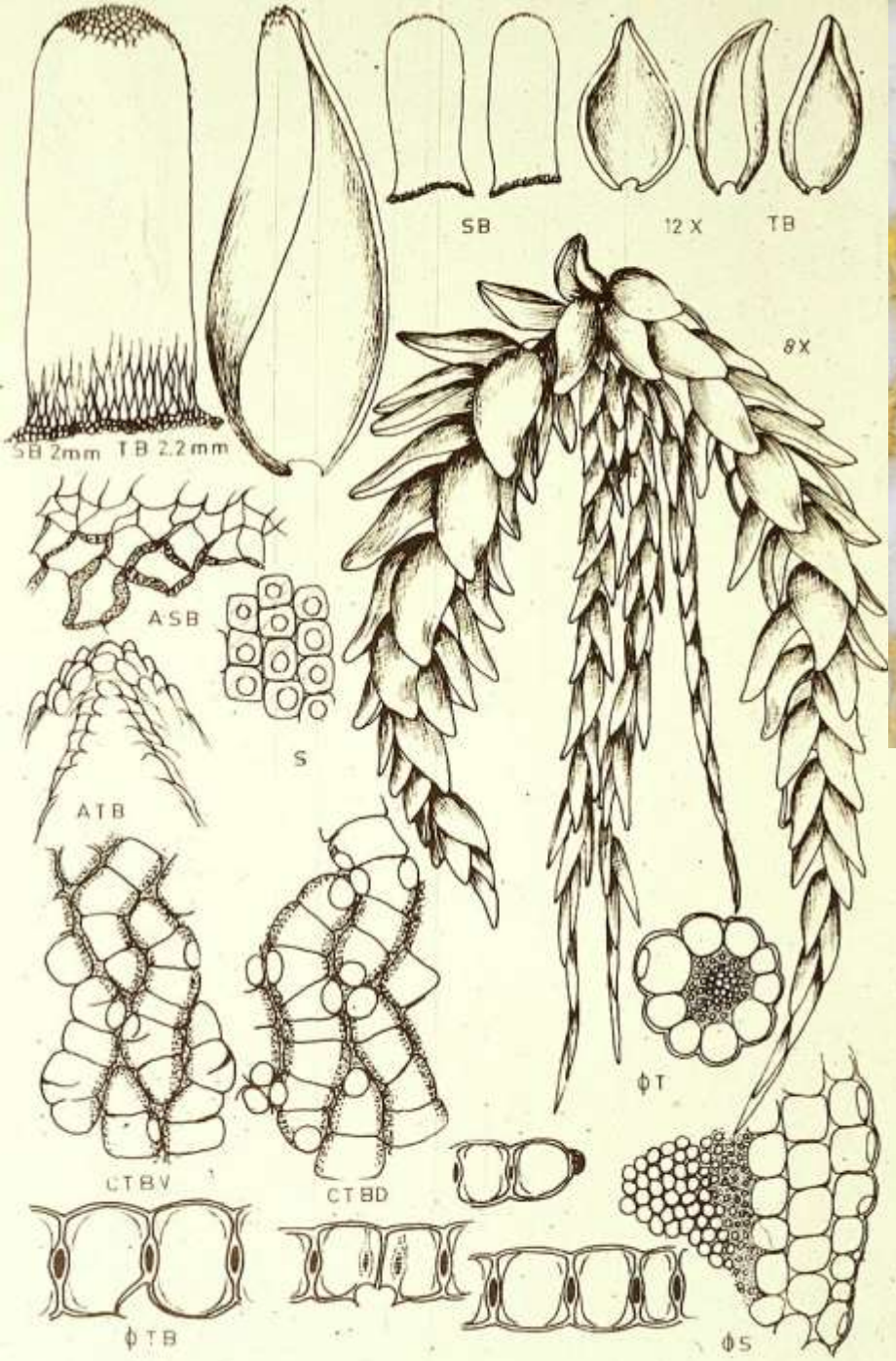
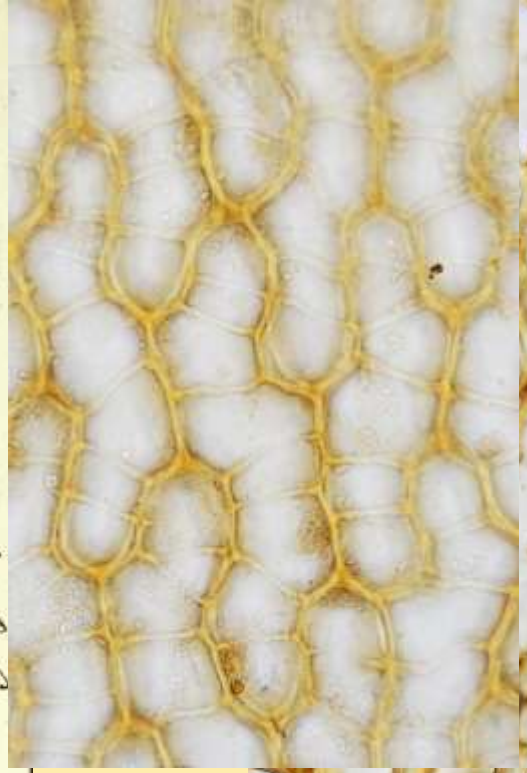
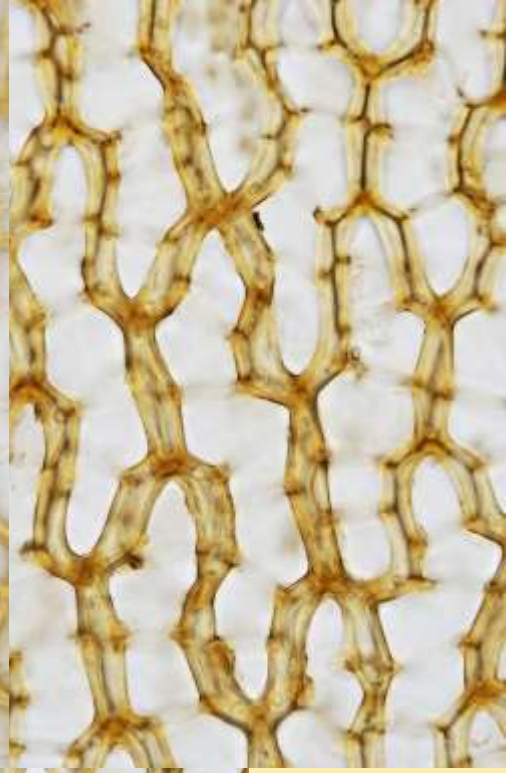
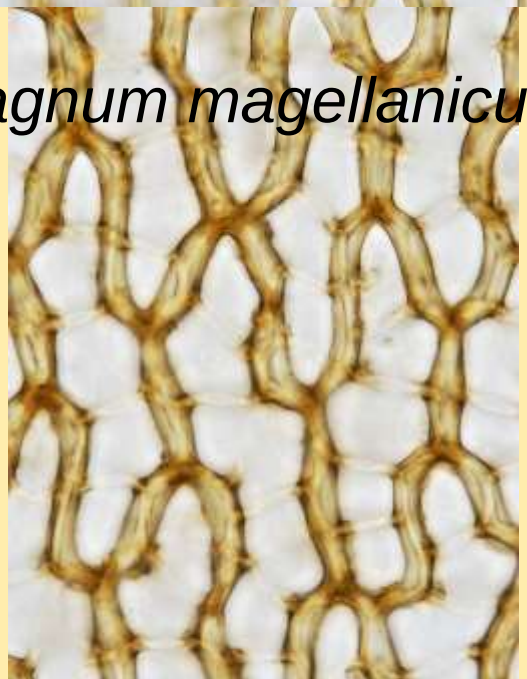


Fig. 3 - *Sphagnum magellanicum* Brid.



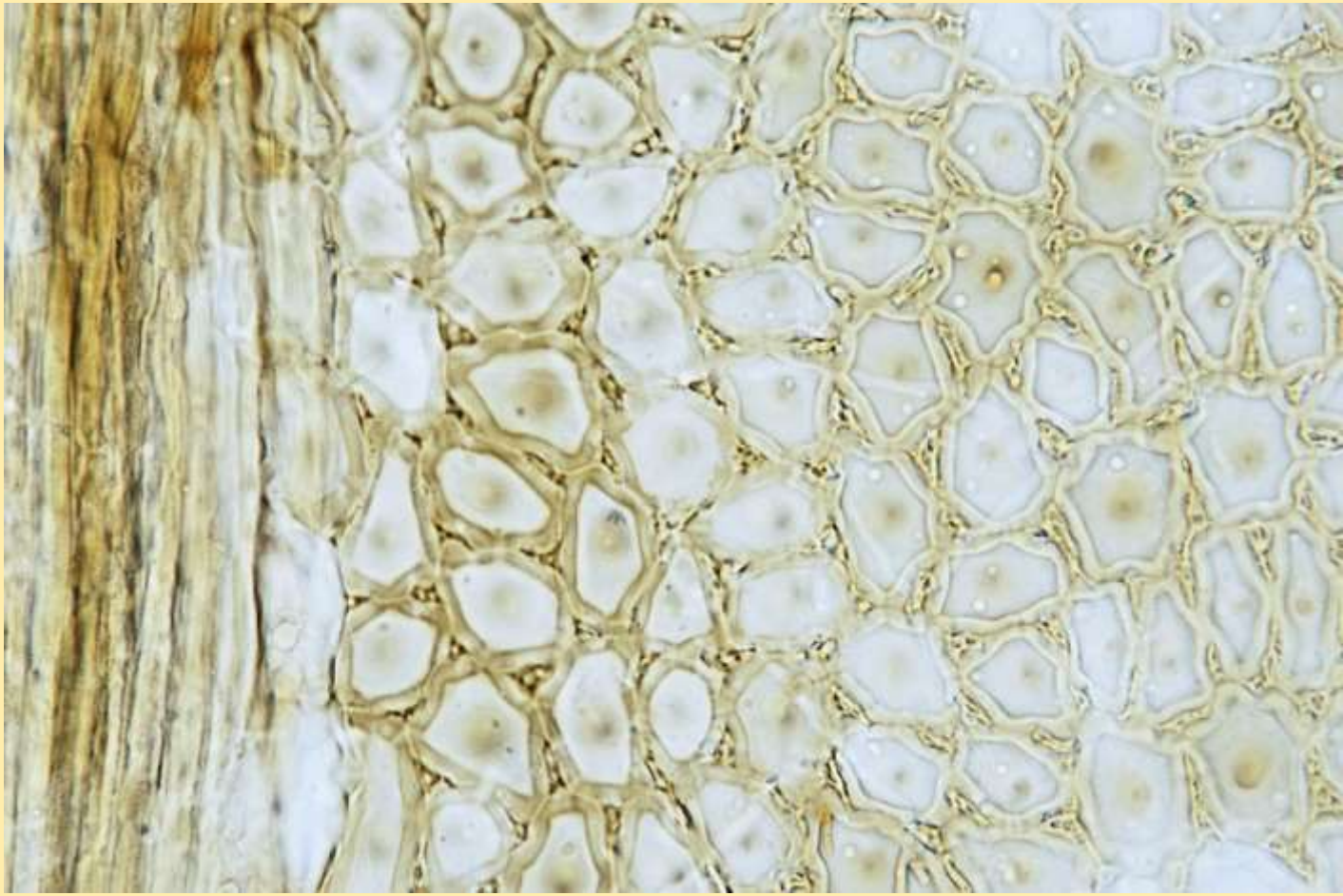


Sphagnum magellanicum



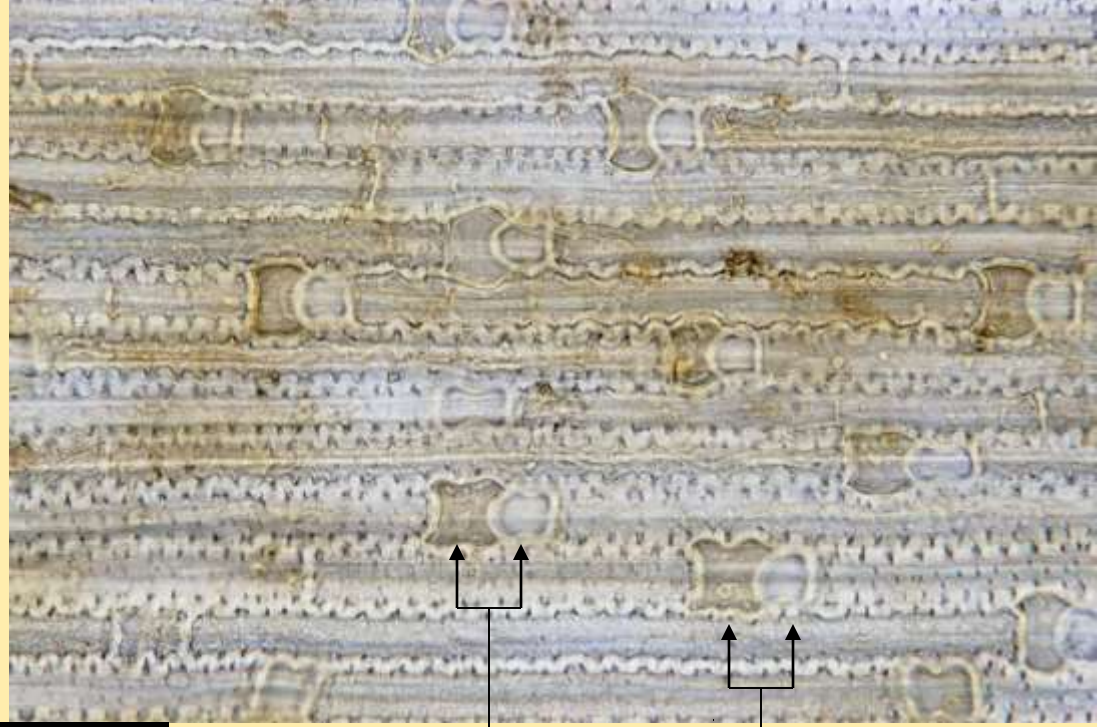
Polytrichum juniperinum
Zandhaarmos

Fig. 41 - *Polytrichum juniperinum* Hedw.
Fig. 42 - *Polytrichum juniperium* Hedw. var. *strictum* (Turn.) Liljebl.



Aulacomnium palustre
Rood viltmos

epidermis



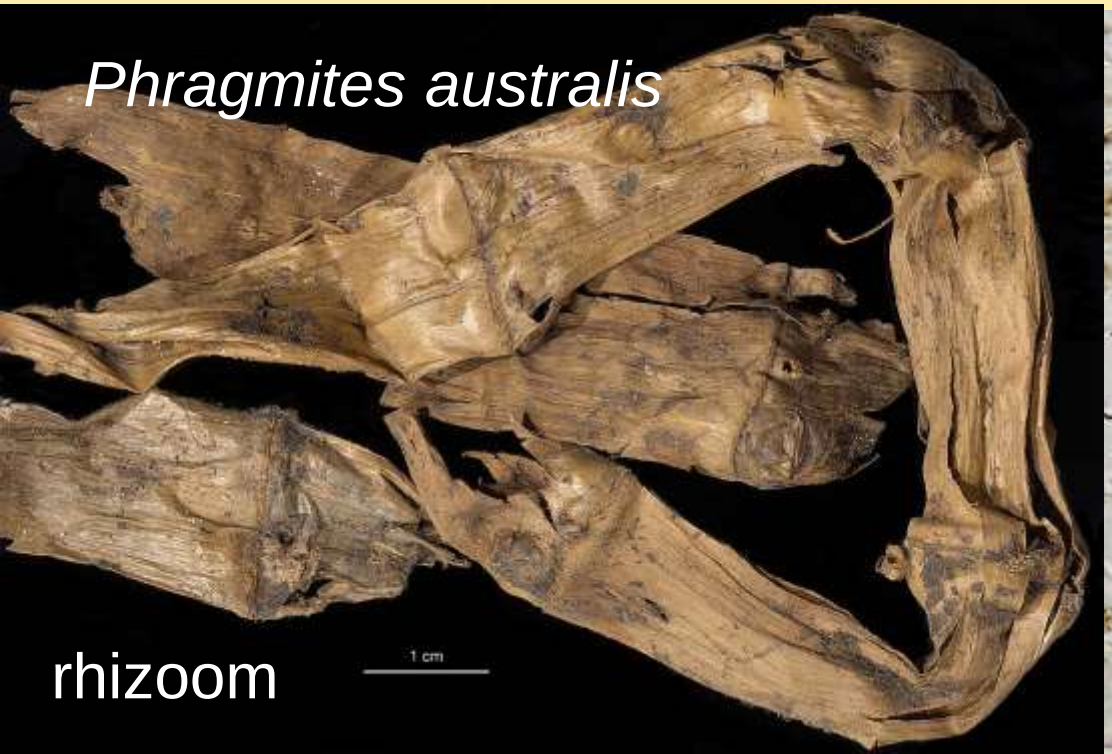
Paren van korte cellen:
smal en breed

stengelbases

Molinia coerulea
Pijpenstrootje

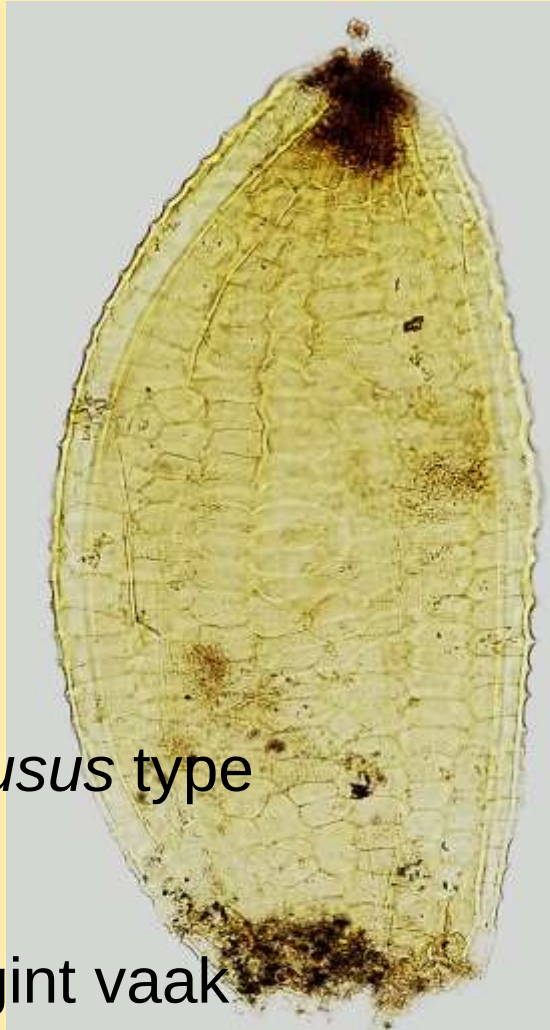
epidermis: een korte cel tussen lange cellen

Riet



Juncus articulatus type

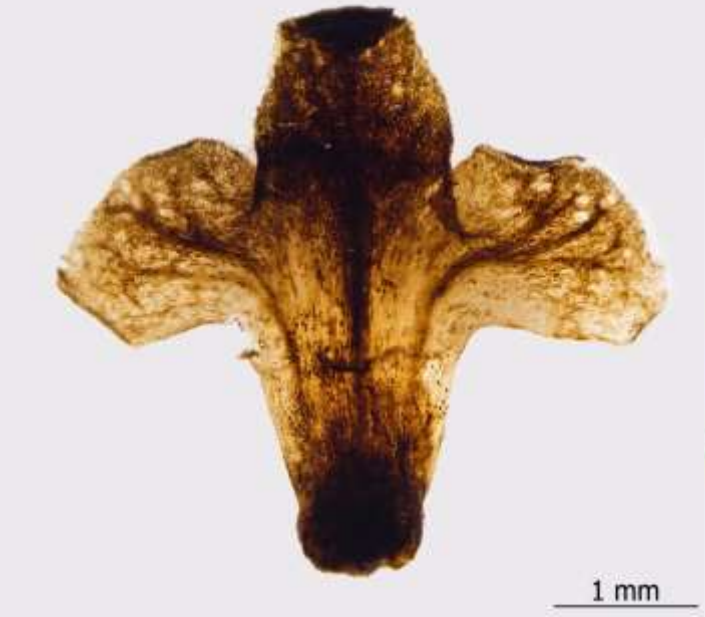
Juncus zaden
Russen

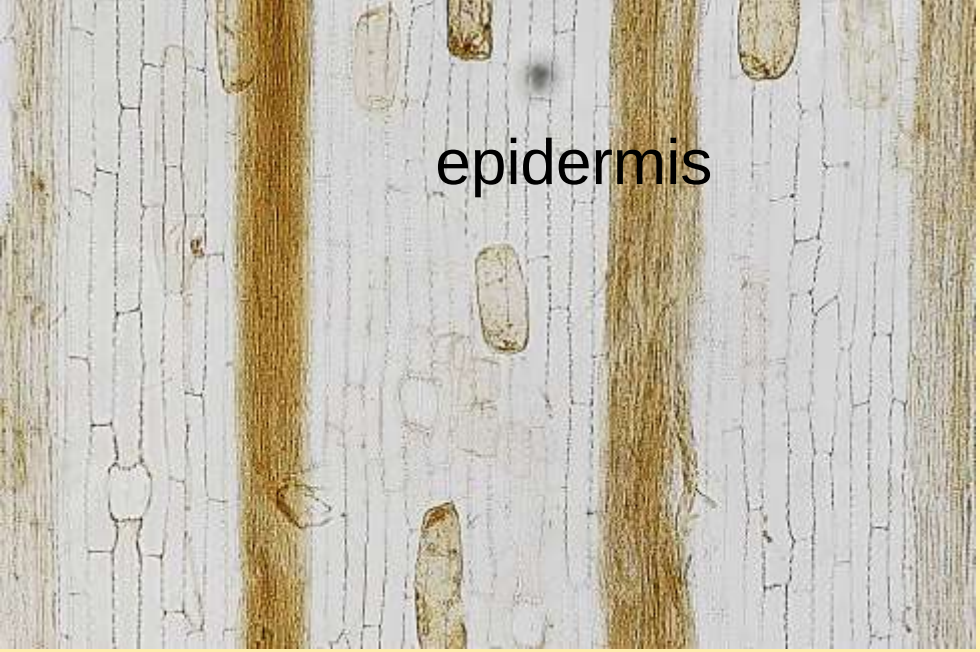


Juncus effusus type

Hoogveenvorming op arme zandbodems begint vaak met een zwart laagje waarin veel zaden van Pitrus (*J. effusus*).

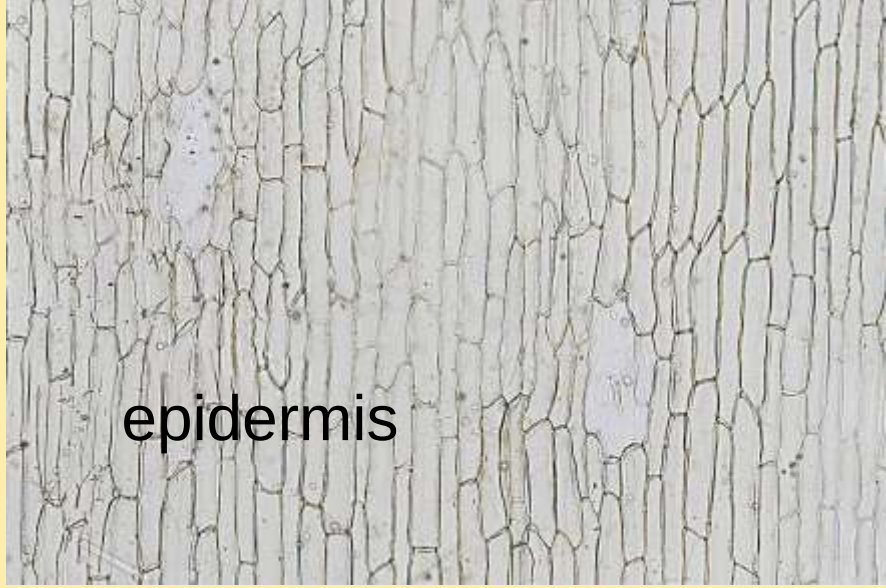
Betula (Berk)





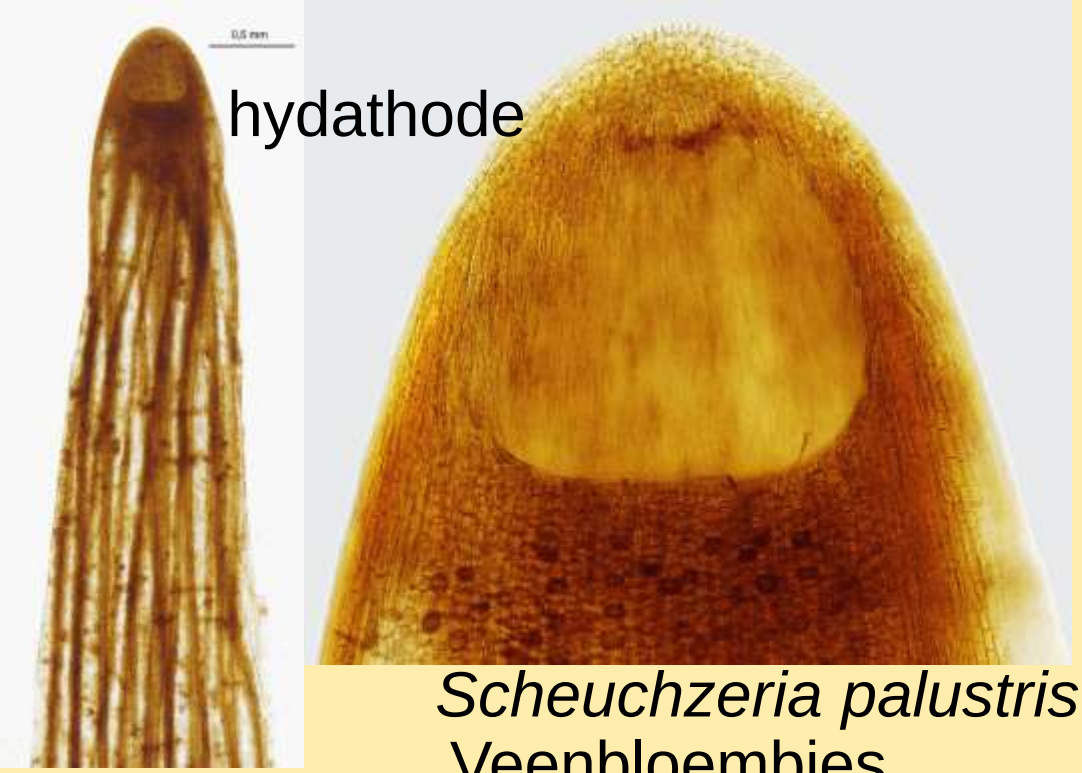
Eriophorum vaginatum

Eenarig wollegras



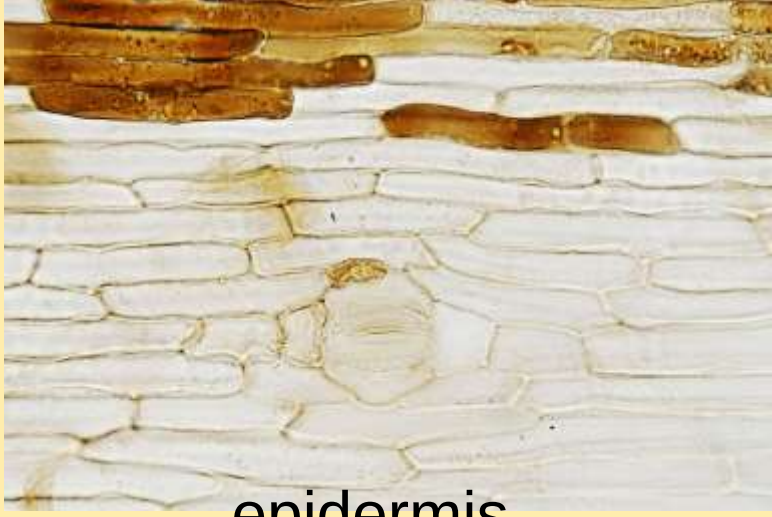
Menyanthes trifoliata

Waterdrieblad

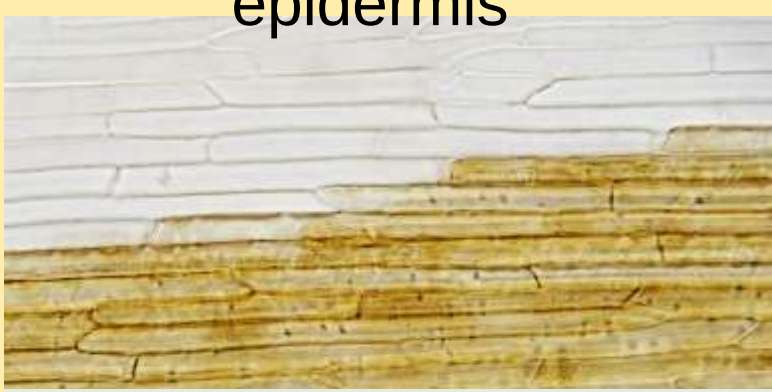


hydathode

Scheuchzeria palustris
Veenbloembies



epidermis



rhizomen

zaden

Scheuchzeria palustris

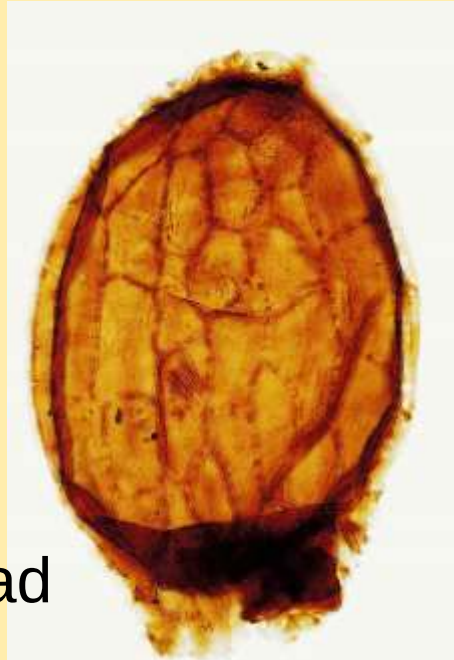
Een belangrijke soort in “overgangsveen”

epidermis

tak

Calluna vulgaris

Struikheide



zaad

epidermis

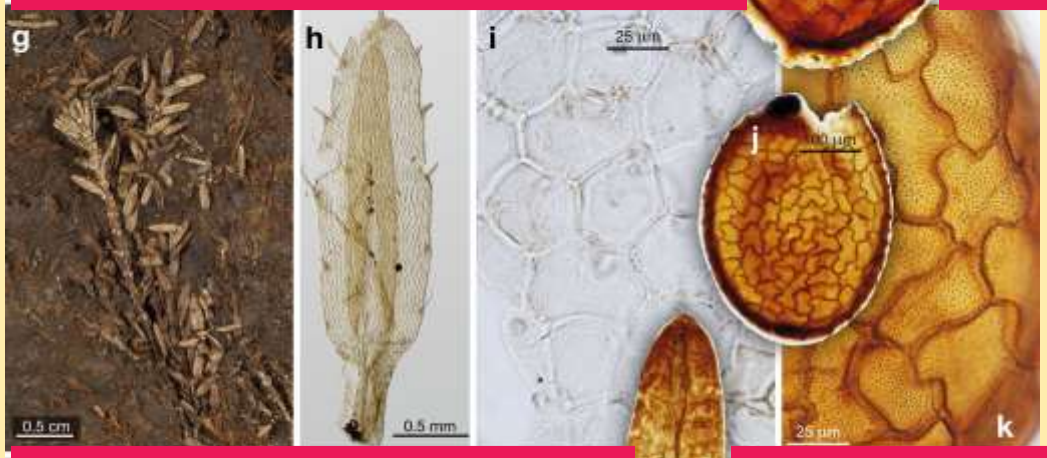
zaad

Andromeda polifolia
Lavendelheide

peat

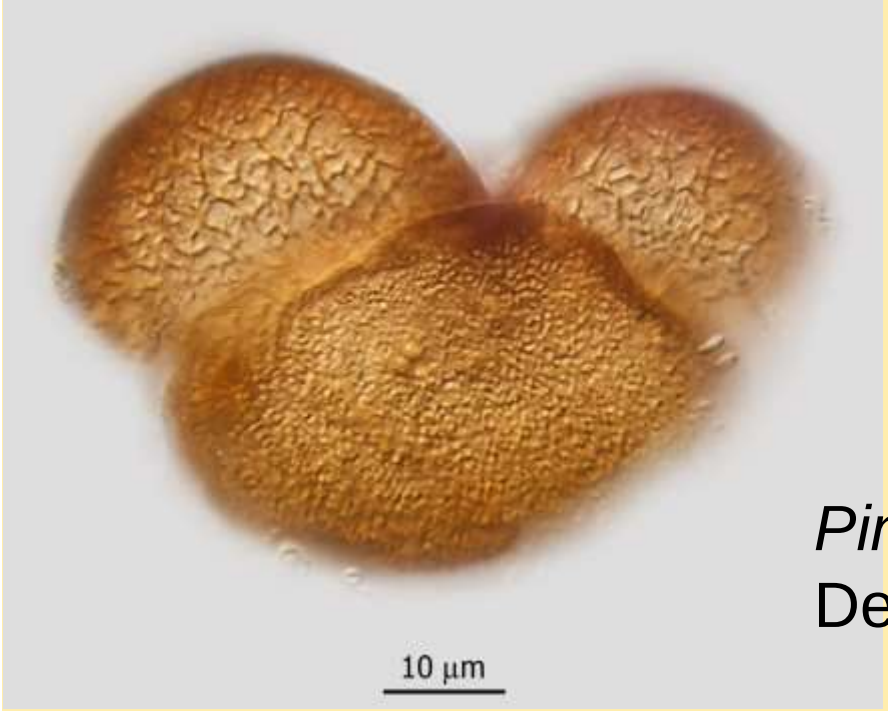
Oxycoccus palustris
Veenbes

Calluna vulgaris

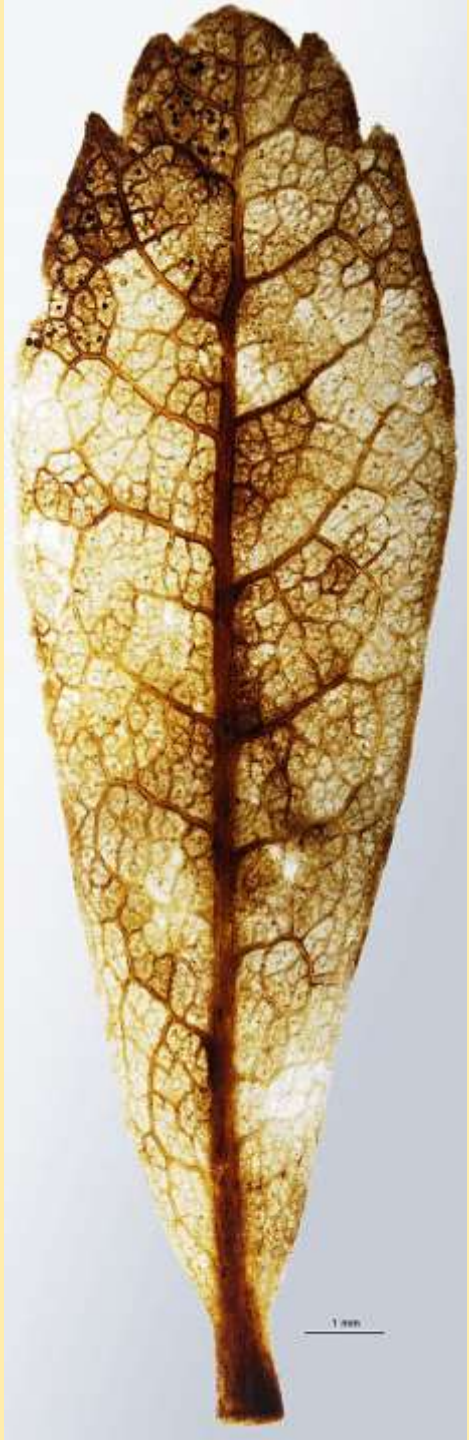


Erica tetralix

Empetrum nigrum



Pinus sylvestris
Den

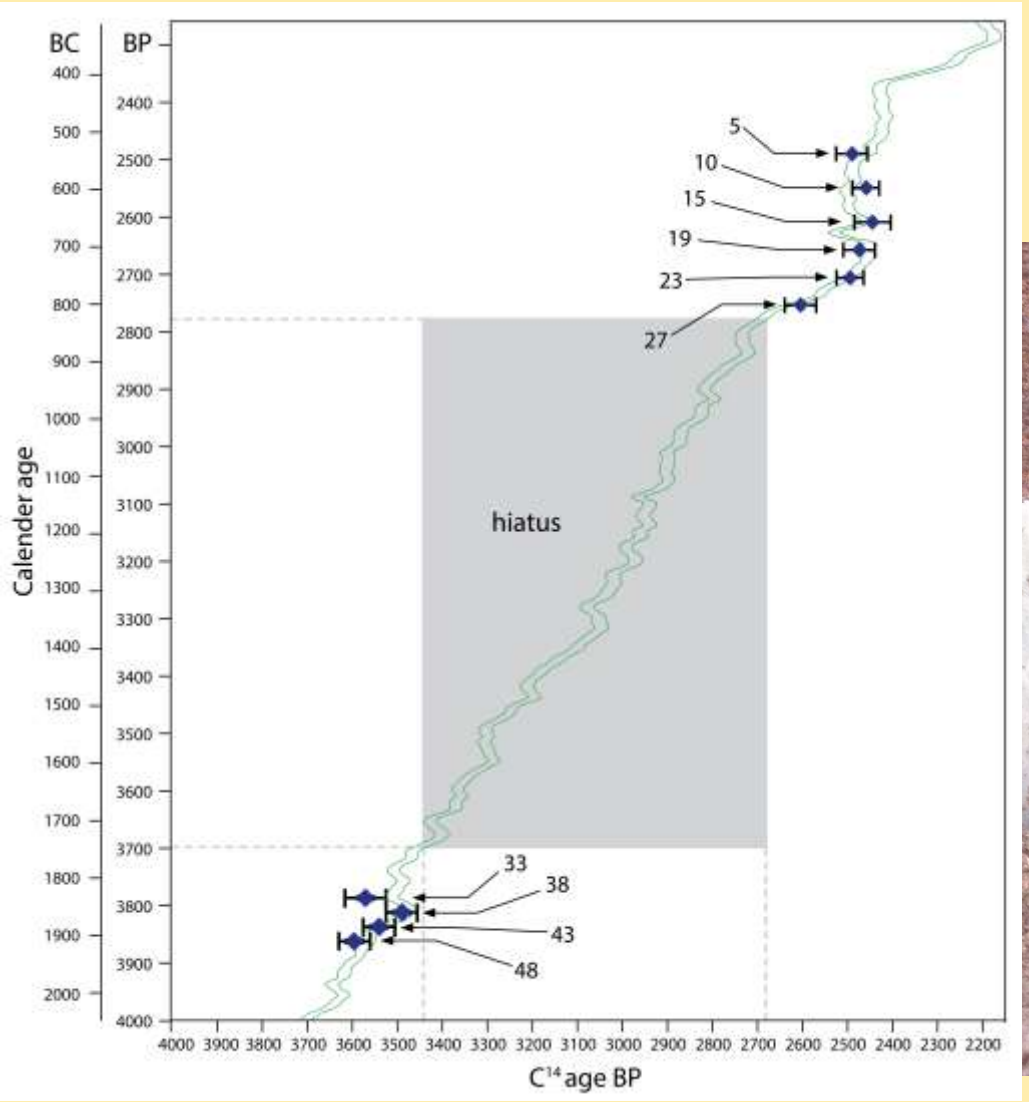


Myrica gale
Gagel

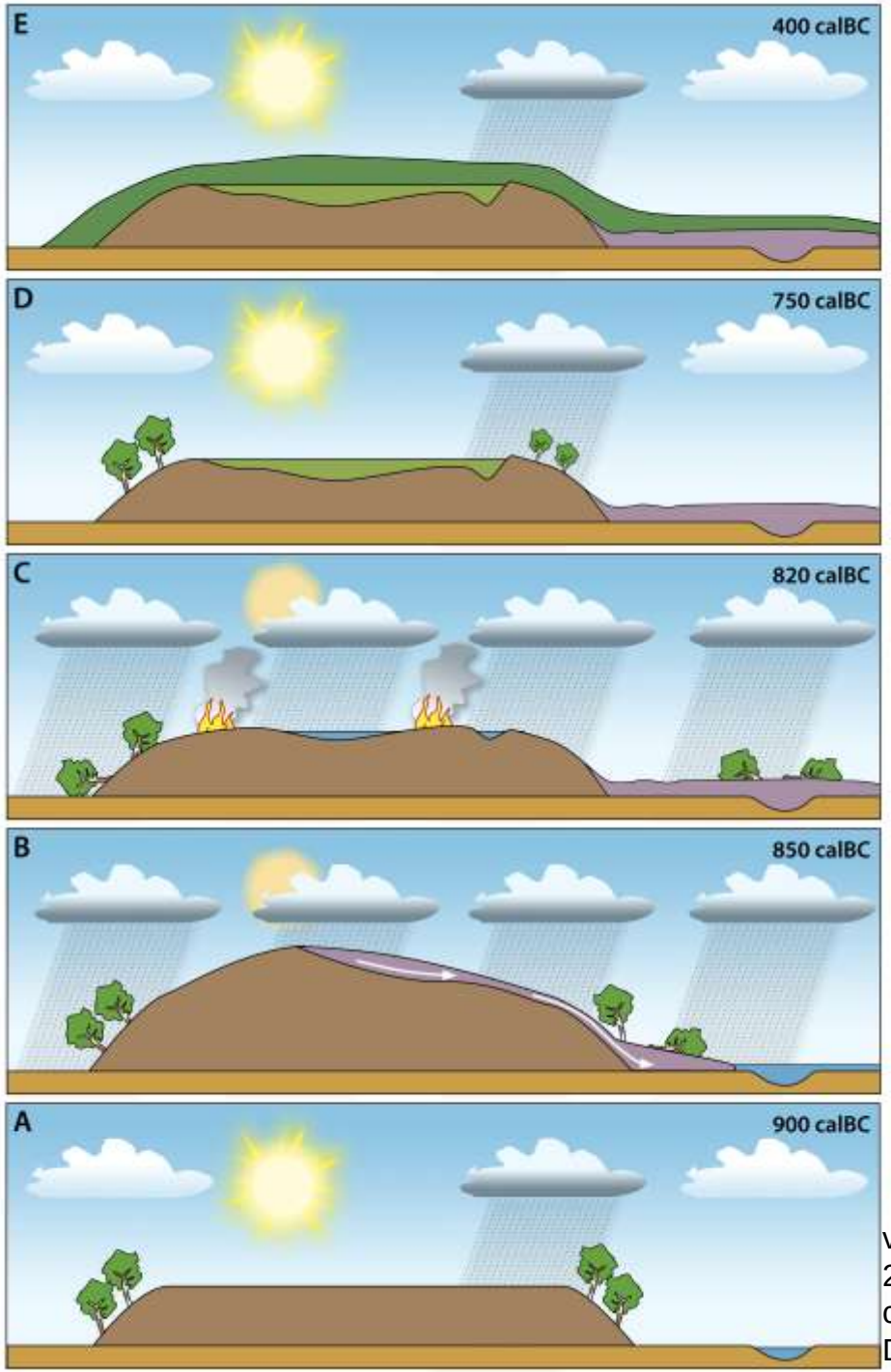
Henk Heijnis op zoek naar de overgang van Subboreaal naar Subatlanticum


Nabij gelegen profiel

Bargerveen



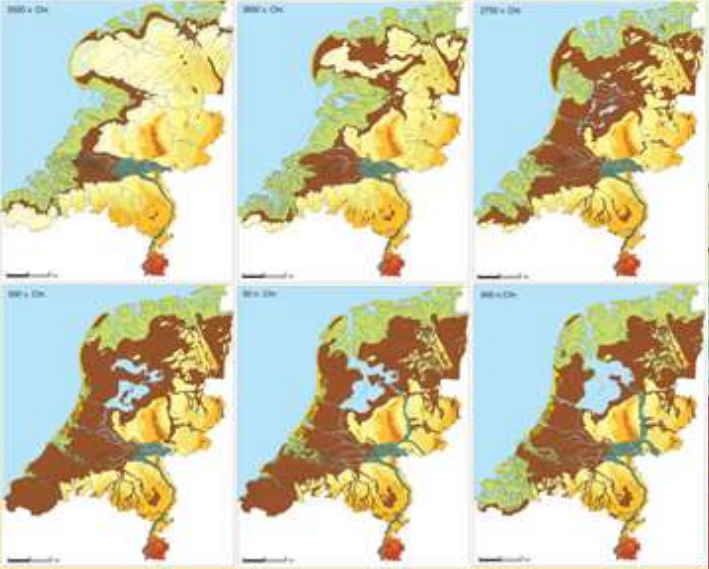
Ruim 900 jaar ontbreekt door een veenuitbraak rond 850 vChr. Sterke afname zonne-activiteit; plotselinge overgang naar koel en vochtig klimaat. Het hoogveen barst en stroomt deels weg.



Zuidoost Drenthe

Een enorme neerslagtoename: veenuitbraak aan het begin van het Subatlanticum (ca 850 vChr.)

van Geel, B., Heijnis, H., Charman, D.J., Thompson, G. and Engels, S. 2014. Bog burst in the eastern Netherlands triggered by the 2.8 kyr BP climate event. The Holocene 24: 1465-1477.
DOI: 10.1177/0959683614544066



Bedankt voor uw aandacht !

B.vanGeel@uva.nl

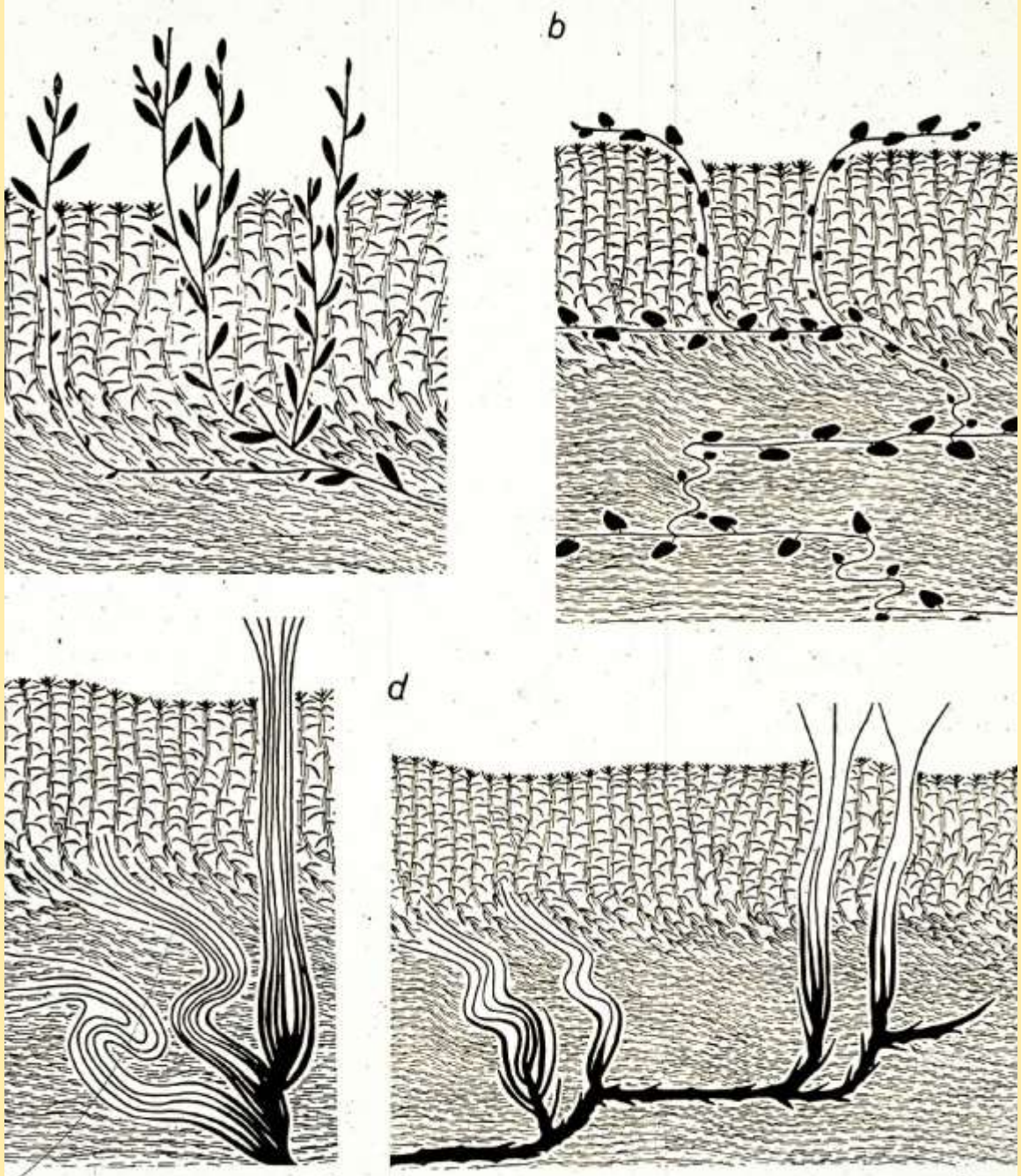
F

Andromeda polifolia

Oxycoccus palustris

Eriophorum vaginatum

Scheuchzeria palustris



bb. 25 Schema der Wachstums- und Einbettungsweise einiger Hochmoorpflanzen im Sphagnumrasen
. Grosse-Brauckmann 1963). a) *Andromeda polifolia*; b) *Vaccinium oxycoccus*; c) *Eriophorum vaginatum*;
d) *Scheuchzeria palustris*.