

ALGAE

Chara & Nitella

show next page (Right Arrow)

CHARA & NITELLA oospores.

Nitella



4-6 whorls

Chara



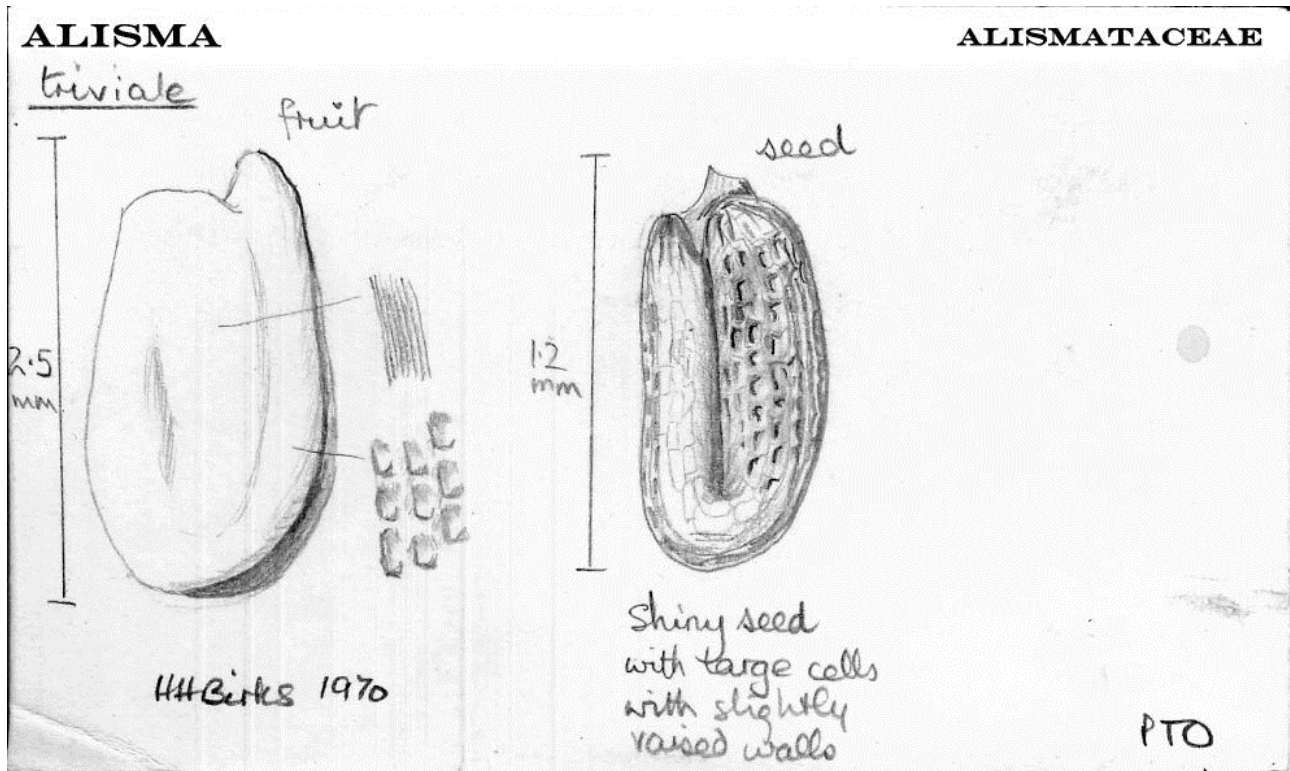
6-12 whorls

'claws' can break off easily

HHBills 1970

ALISMATACEAE

Alisma triviale



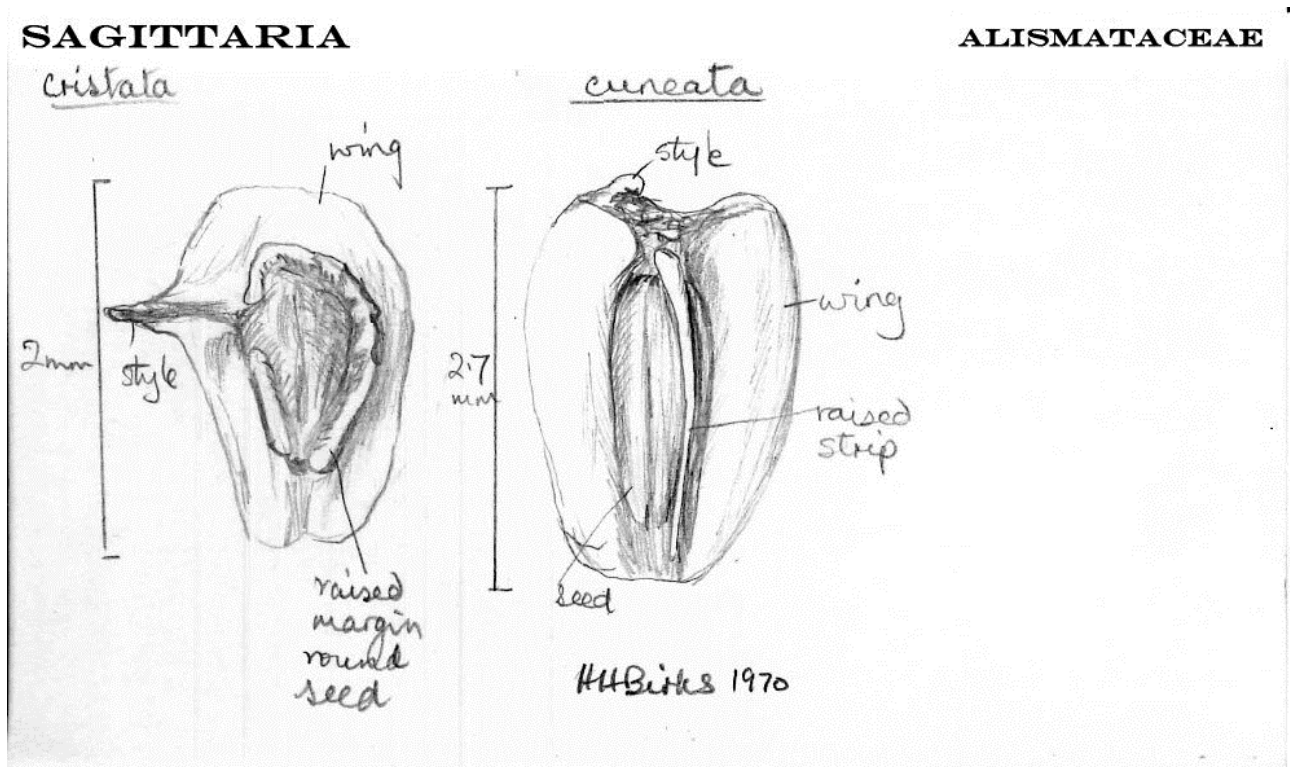
Alisma subcordatum seeds are similar

A. gramineum are also similar but about 1.5 mm

Lophotocarpus calycinus. Narrow arm is shorter than wide arm, and fruit is also more assymetrical

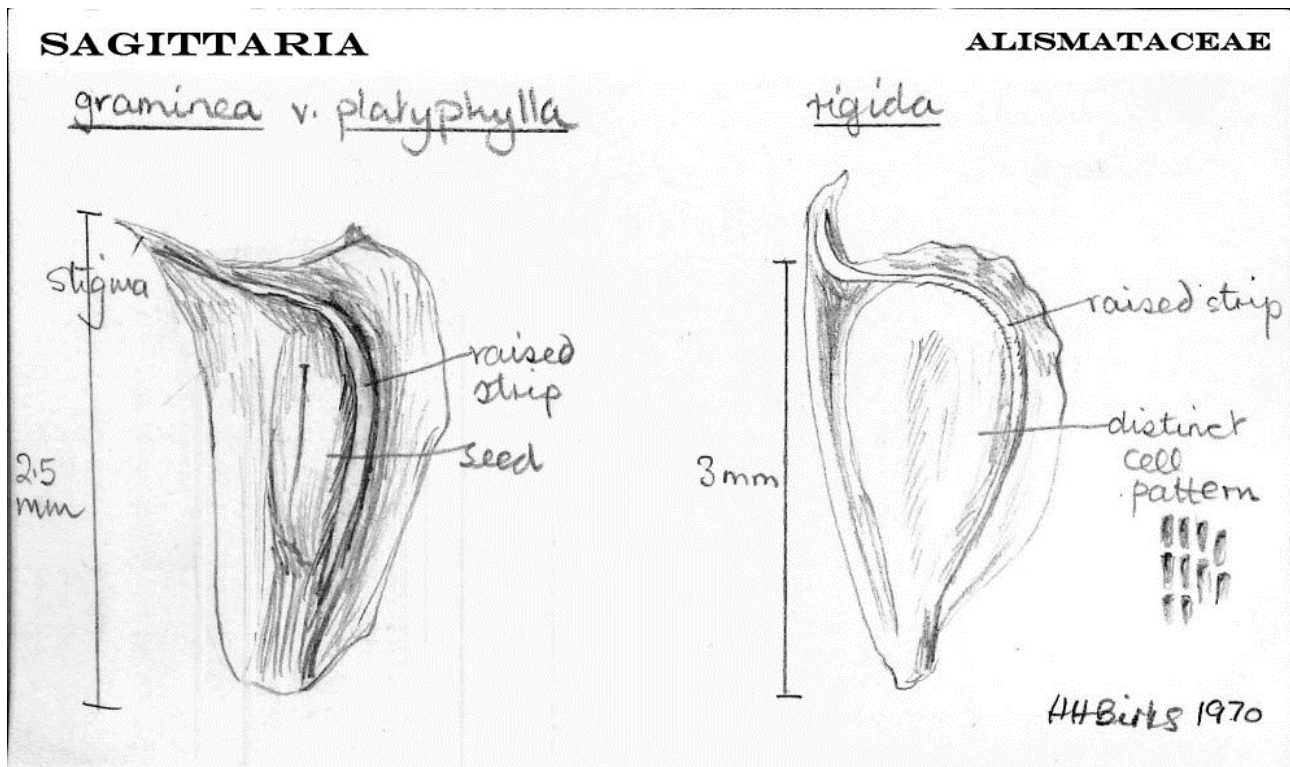
Sagittaria

cristata, cuneata

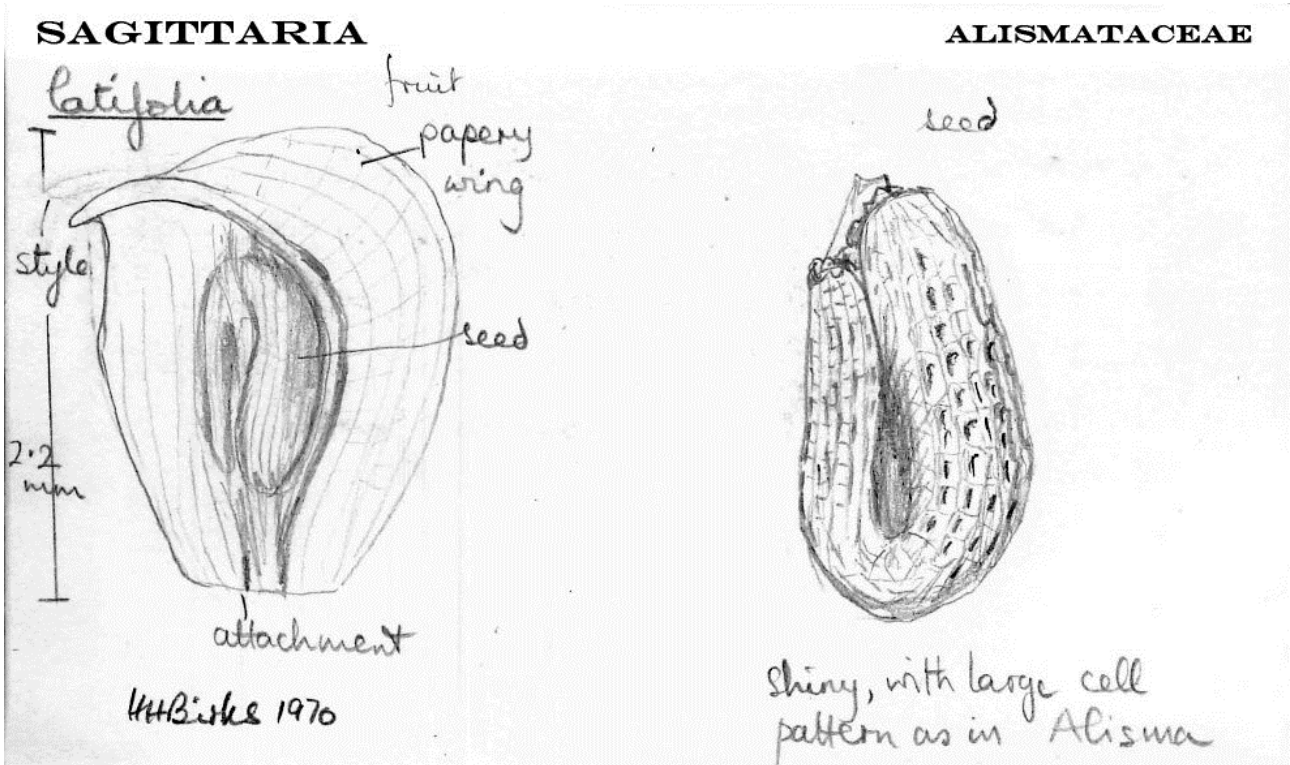


Sagittaria

graminea var. platyphylla, rigida



Sagittaria latifolia



Native to Minnesota

S. cristata

Alisma gramineum

S. cuneata

A. subcordatum

S. graminea

A. triviale

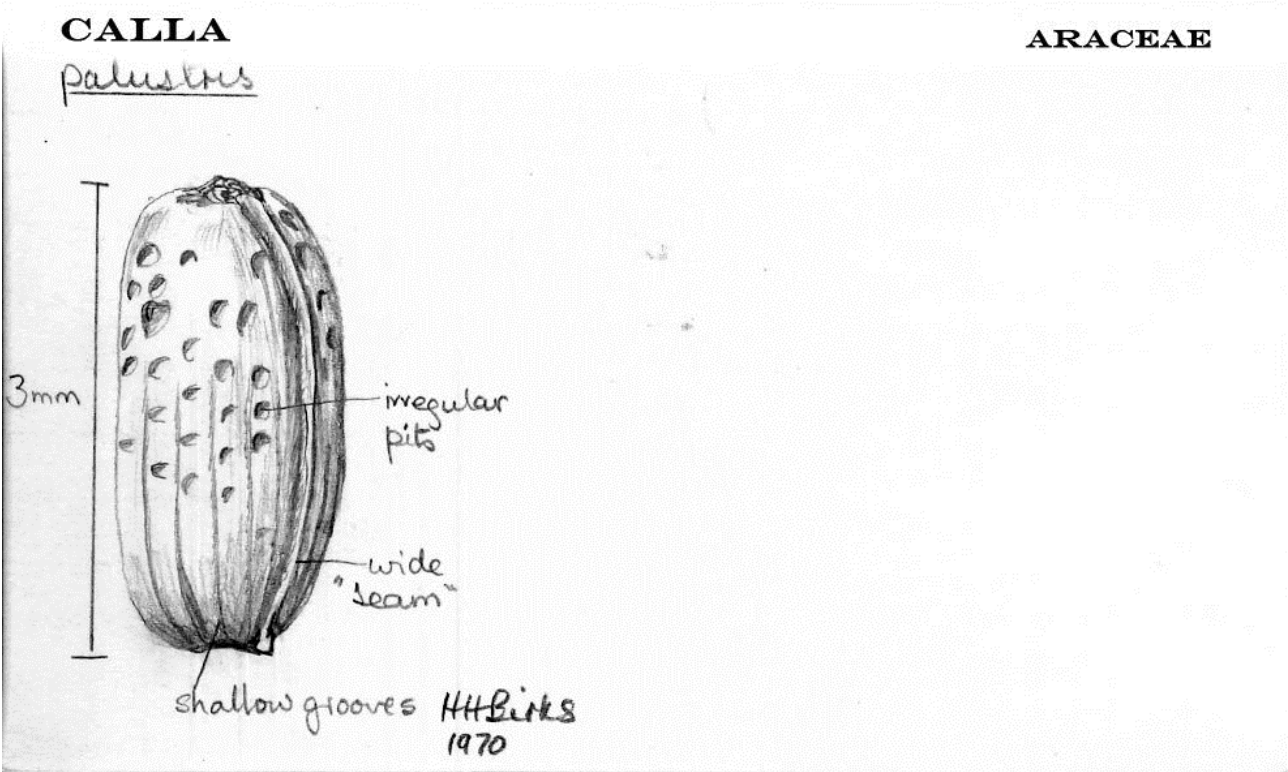
S. latifolia

S. rigida

Lophotocarpus calycinus

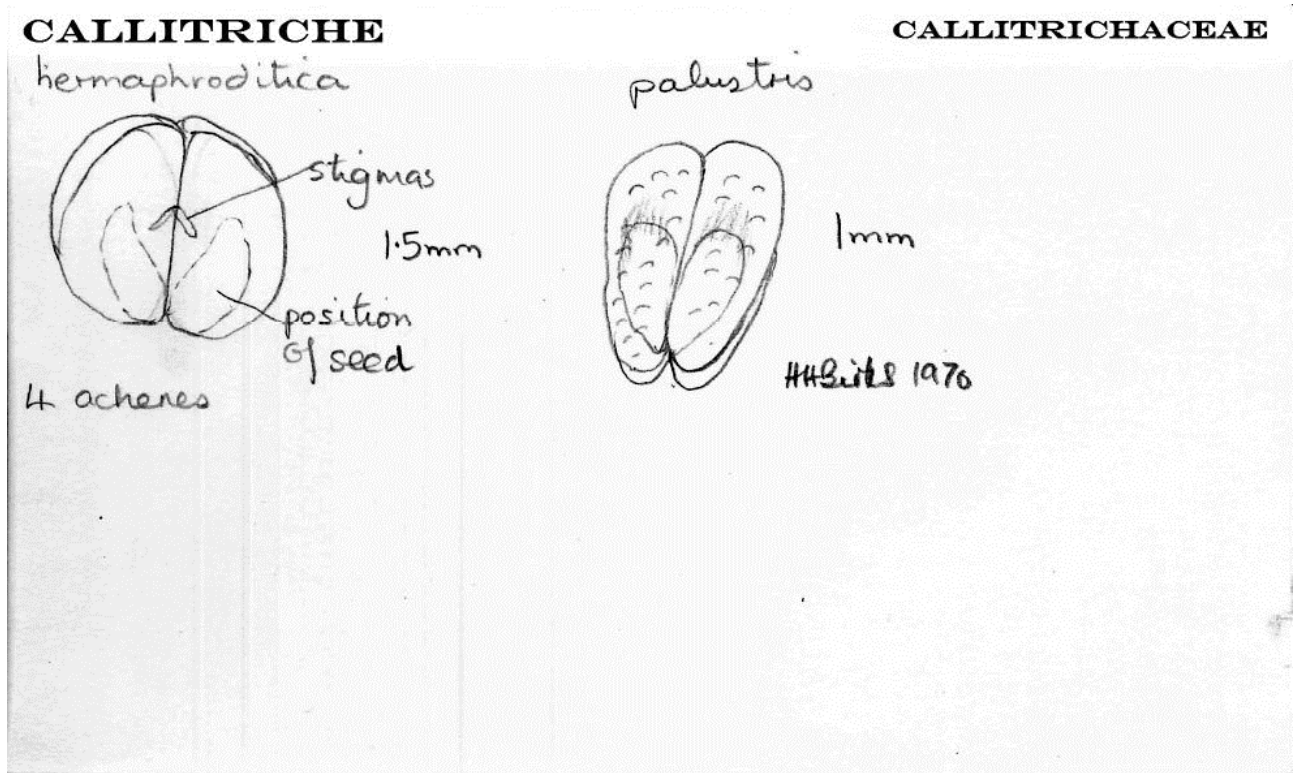
ARACEAE

Calla palustris



CALLITRICHACEAE

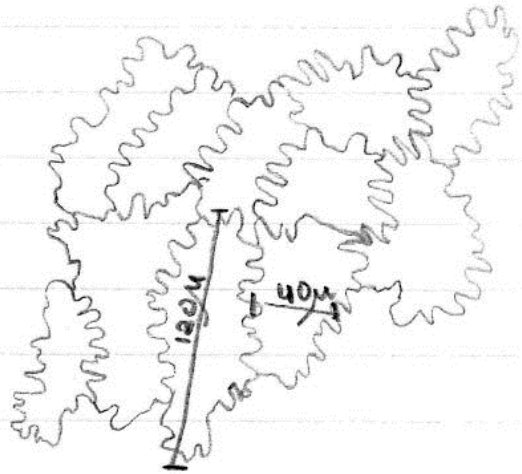
Callitriche hermaphrodita



CARYOPHYLLACEAE

Minuartia rubella

MINUARTIA rubella



HHBirks 1971

Minuartia stricta

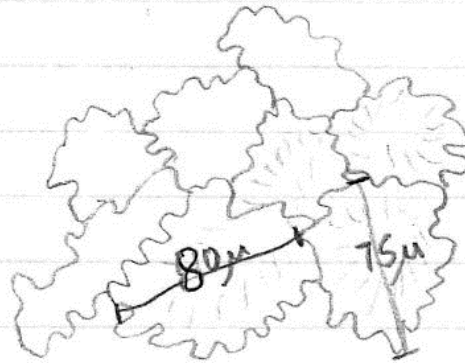
MINUARTIA stricta



HHBirks 1971

Sagina intermedia

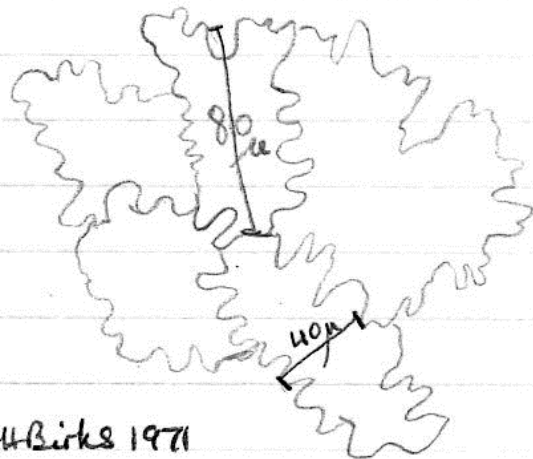
Sagina intermedia



H.H. Birks 1971

Sagina nodosa

SAGINA nodosa

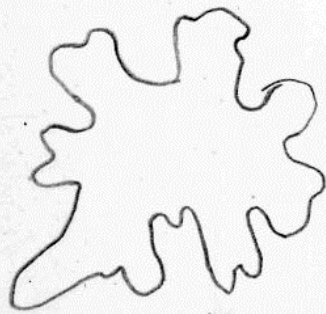


H.H. Birks 1971

Stellaria crassifolia

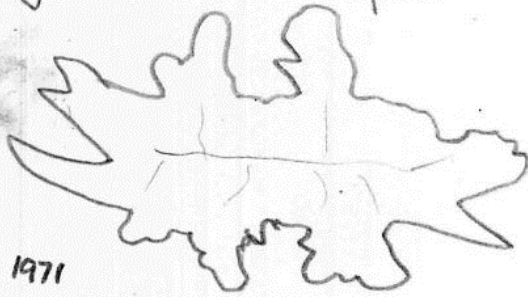
STELLARIA *crassifolia*

CARYOPHYLLACEAE

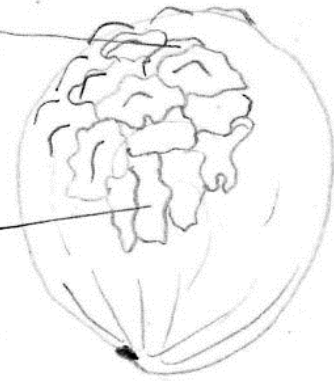


near top

middle of face



HHBirk 1971

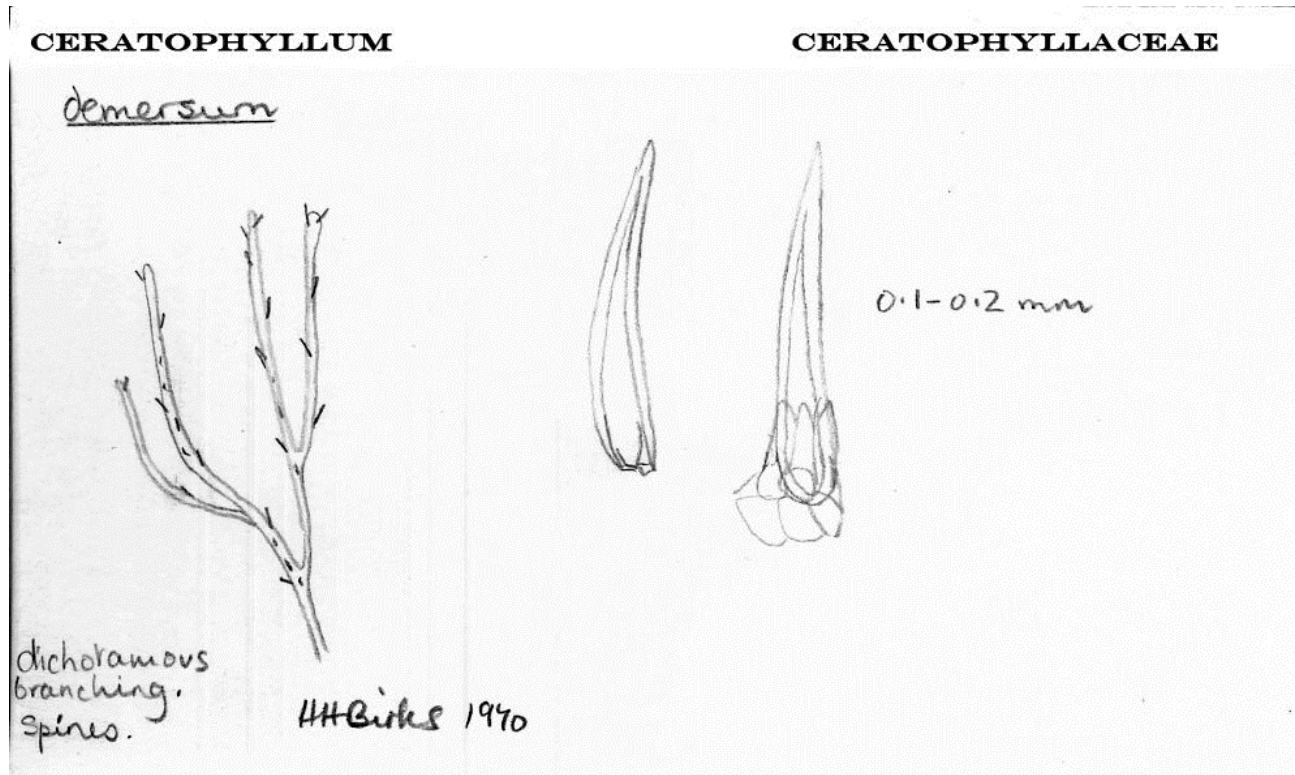


1mm

low bumps, smooth
in outline,
occasionally ridged.

CERATOPHYLLACEAE

Ceratophyllum demersum



CERATOPHYLLUM

CERATOPHYLLACEAE

demersum

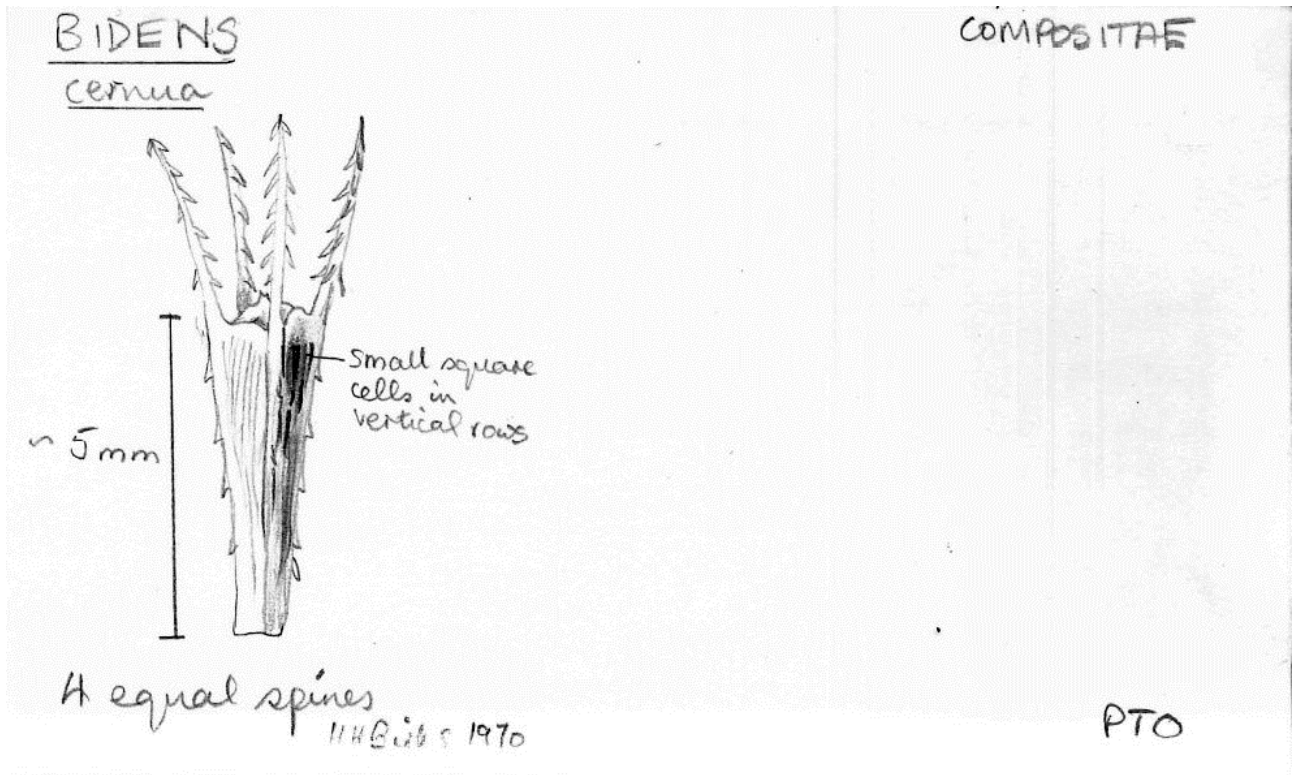
dichotamous
branching.
Spines.

HH Birks 1970

0.1-0.2 mm

COMPOSITAE

Bidens cernua



B. comosa 3 spines. or rarely, 2 long & 2 short

B. connata 3 or 4. 2 long & 1 or 2 short. warty with hairs

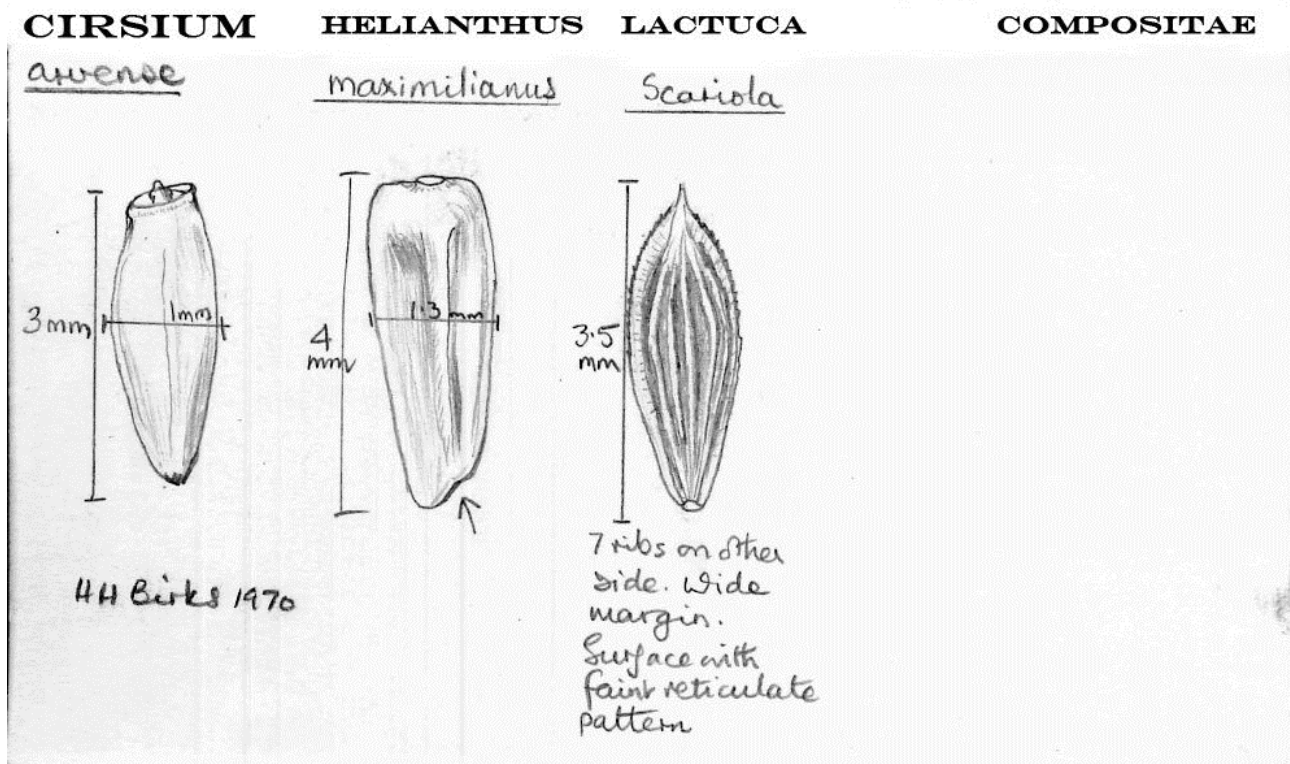
B. coronata. 2 spiny peaks at sides M

B. discolorata 2. Hairy

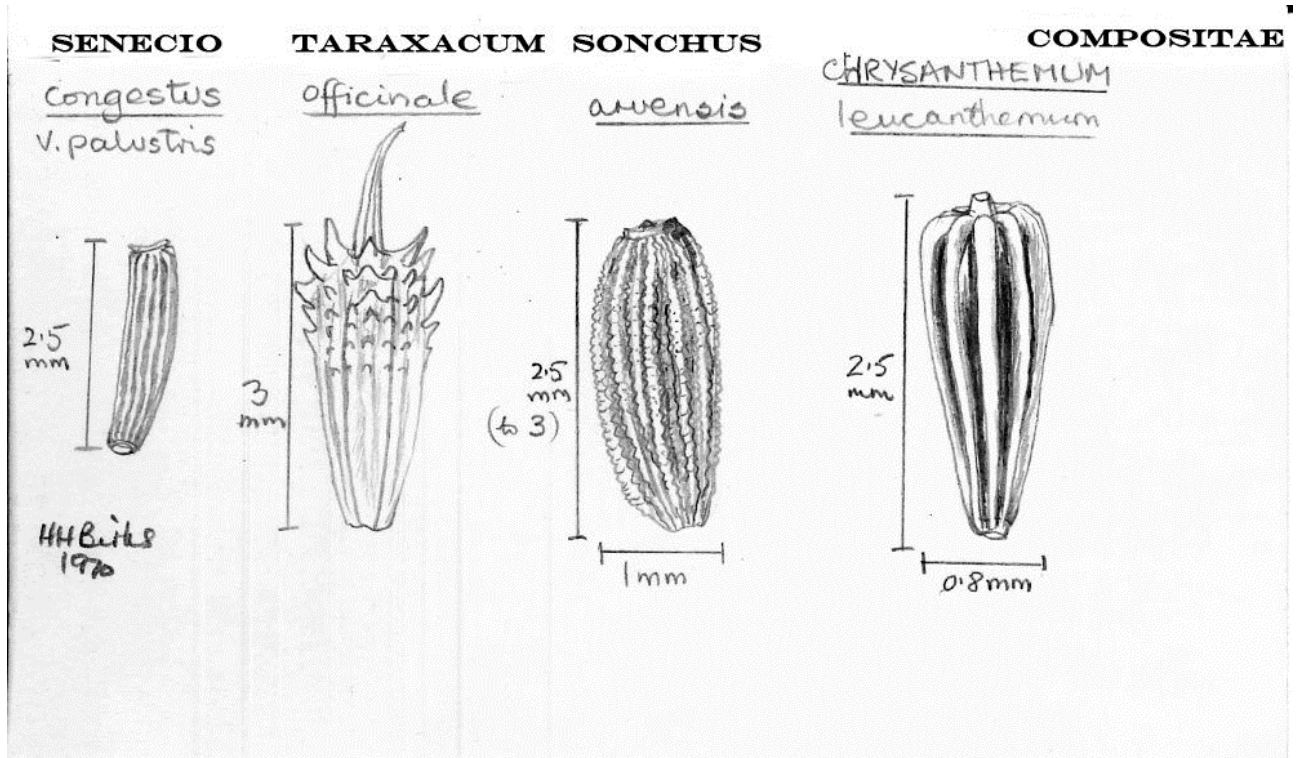
B. frondosa 2. Large warty fruit

B. vulgata 2. Large warty fruit

Cirsium arvense, *Helianthus maximilianus*, *Lactuca scariola*



Senecio congestus var. *palustris*, *Taraxacum officinale*, *Sonchus arvensis*, *Chrysanthemum leucanthemum*

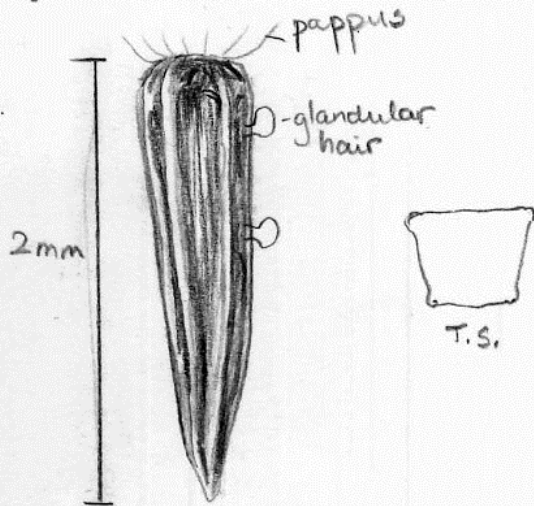


Eupatorium perfoliatum

EUPATORIUM

COMPOSITAE

perfoliatum



longitudinal rows of small rather shiny cells. Glandular hairs scattered over fresh fruit

E. altissimum. Similar, but wider no glands

E. maculatum. Same width as *E. perfol* but 4 mm long Glands

E. purpureum. Similar ↑ small glands

E. rugosum. Similar to *E. perfoliatum* but 2.5-3 mm, no glands, & rather well marked cell pattern

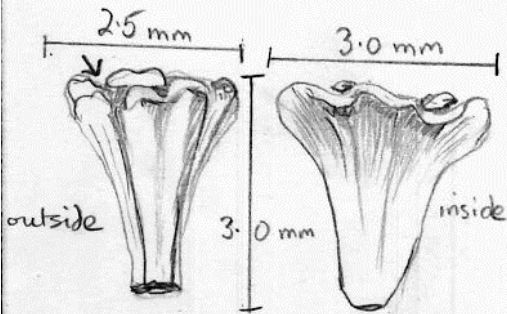
HH Birks 1970

CORYLACEAE

Alnus crispa

ALNUS

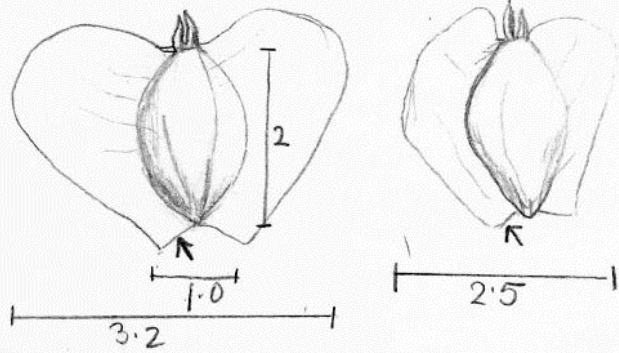
Crispa



♀ cone-scale, mature

HH Birks 1970

CORYLACEAE



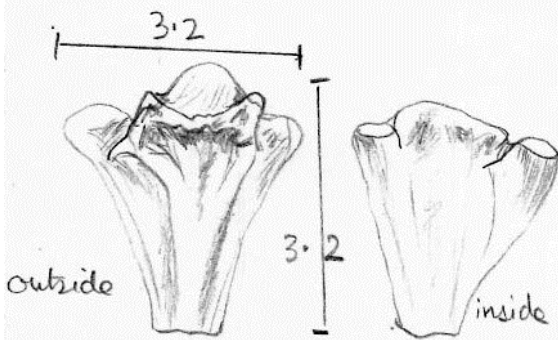
Fruits - range of wing shape.

P.T.O

Alnus rugosa

ALNUS

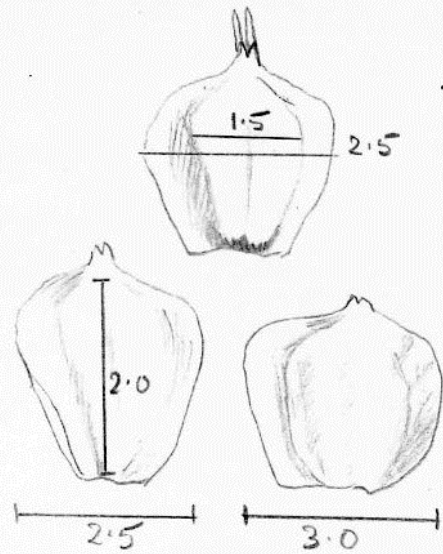
Rugosa



♀ cone-scale mature

HH Birks 1970

CORYLACEAE



Fruits - Seed not well demarcated

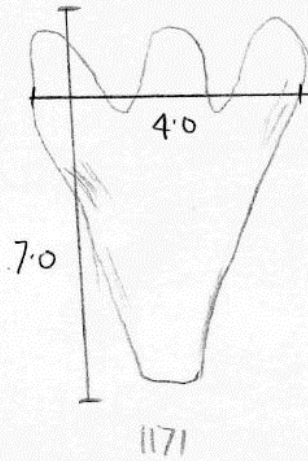
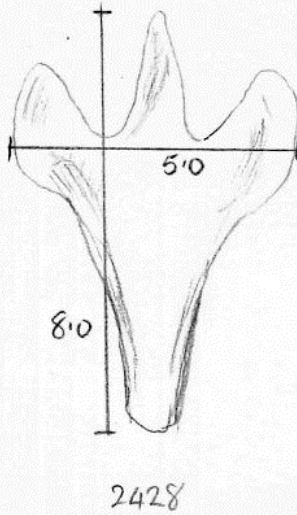
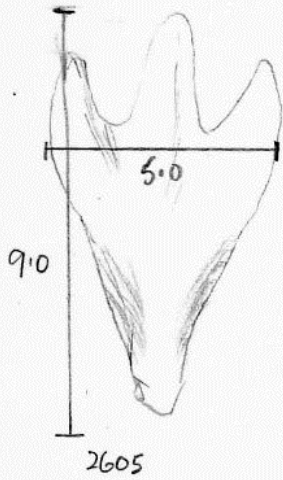
P.T.O

Betula lutea

BETULA

CORYLACEAE

lutea



♀ cone-scales

Relatively large, lobes ± equal in breadth

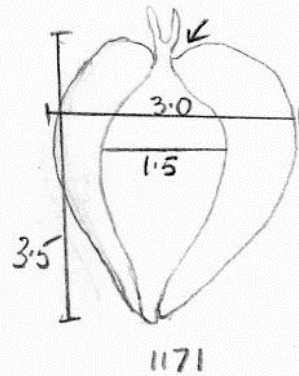
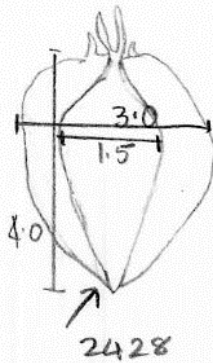
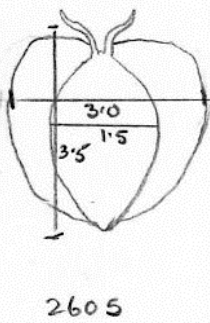
PTO

HHBirk 1970

BETULA

CORYLACEAE

lutea



fruits

Relatively narrow wings, joining above the top of the seed.
basal ∠ of fruit < 180°

HHBirk 1970

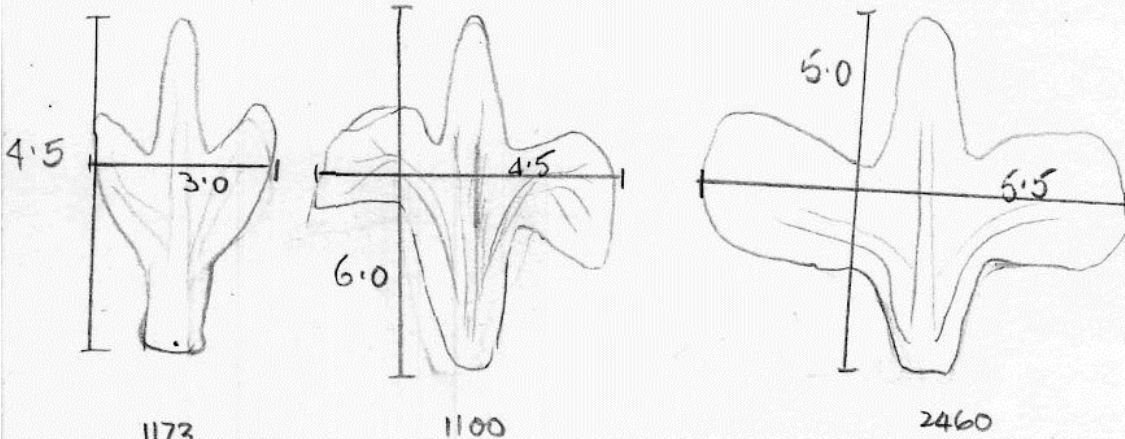
PTO

Betula papyrifera

BETULA

CORYLACEAE

papyrifera



1173
3 collections

1100

2460

Constant feature is long narrow central lobe, and relatively wide spreading laterals.

PTO

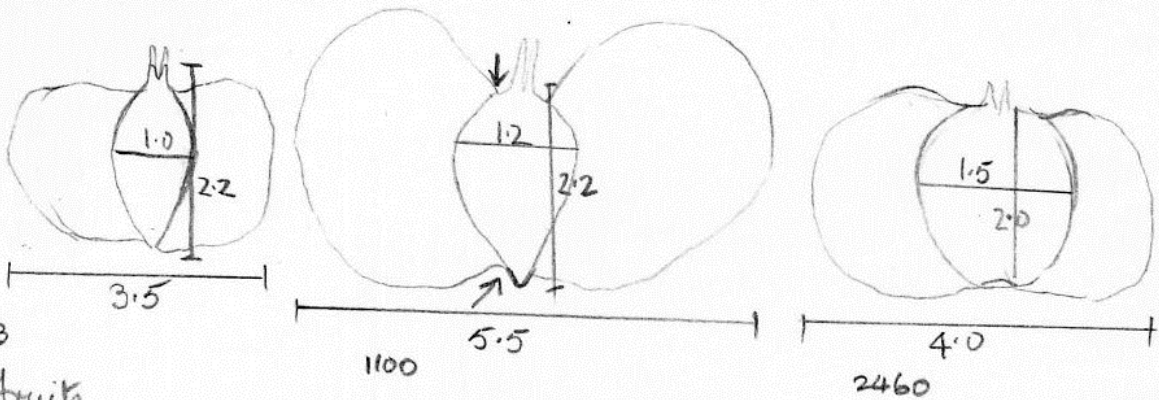
HHBirk 1970

BETULA

CORYLACEAE

papyrifera

fruits



1173

1100

2460

fruits

wide wings tending to join fruit on shoulder; \pm flat at base

HHBirk 1970

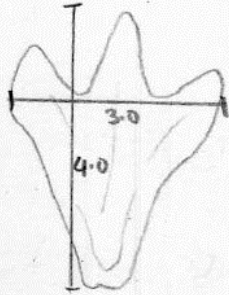
PTO

Betula pumila var. *glandulifera*

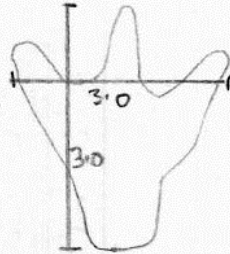
BETULA

CORYLACEAE

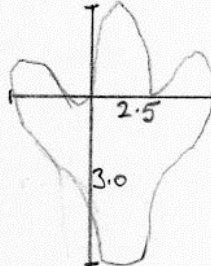
pumila var. *glandulifera*



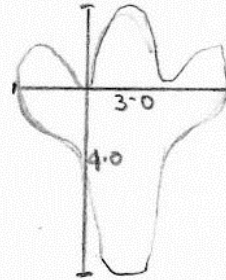
1174



1135



1205



1175 PTO

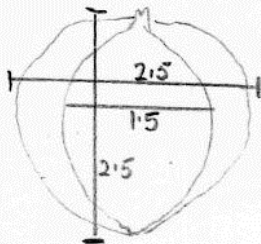
♀ Cone-scales
Relatively small

HHBirks 1970

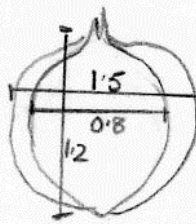
BETULA

CORYLACEAE

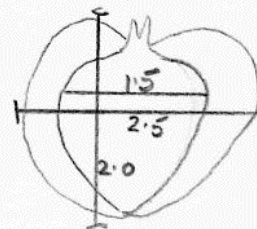
pumila var. *glandulifera*



1174



1135



1205

fruits.

PTO

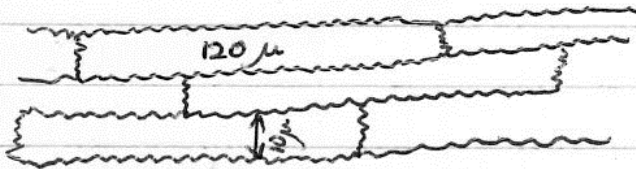
Tend to be wider than long. wings less than 1/2 seed diam.
HHBirks 1970

CYPERACEAE

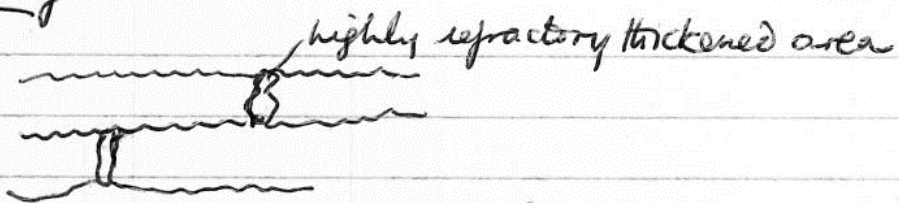
Eriophorum vaginatum

E. RIOPHORUM VAGINATUM

Epidermis betw. veins Lower lf.



Upper lf.

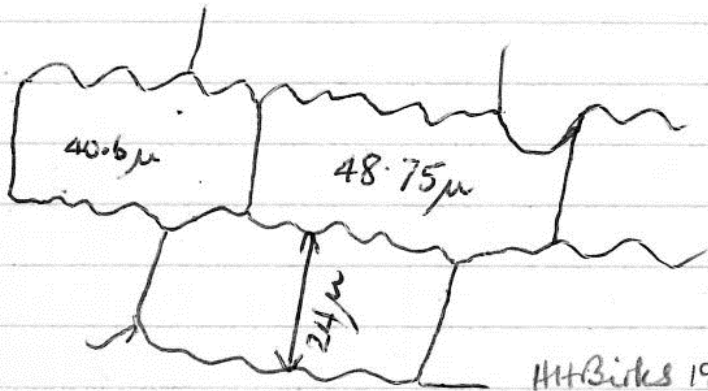


H.H. Birkbe 1971

Trichophorum caespitosum

TRICHOPHORUM CAESPITOSUM

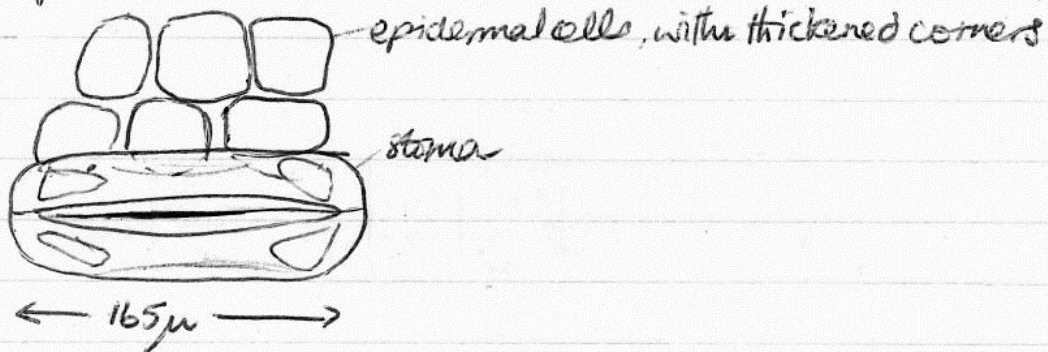
Epidermis of leaf base



HH Birks 1971

PTB

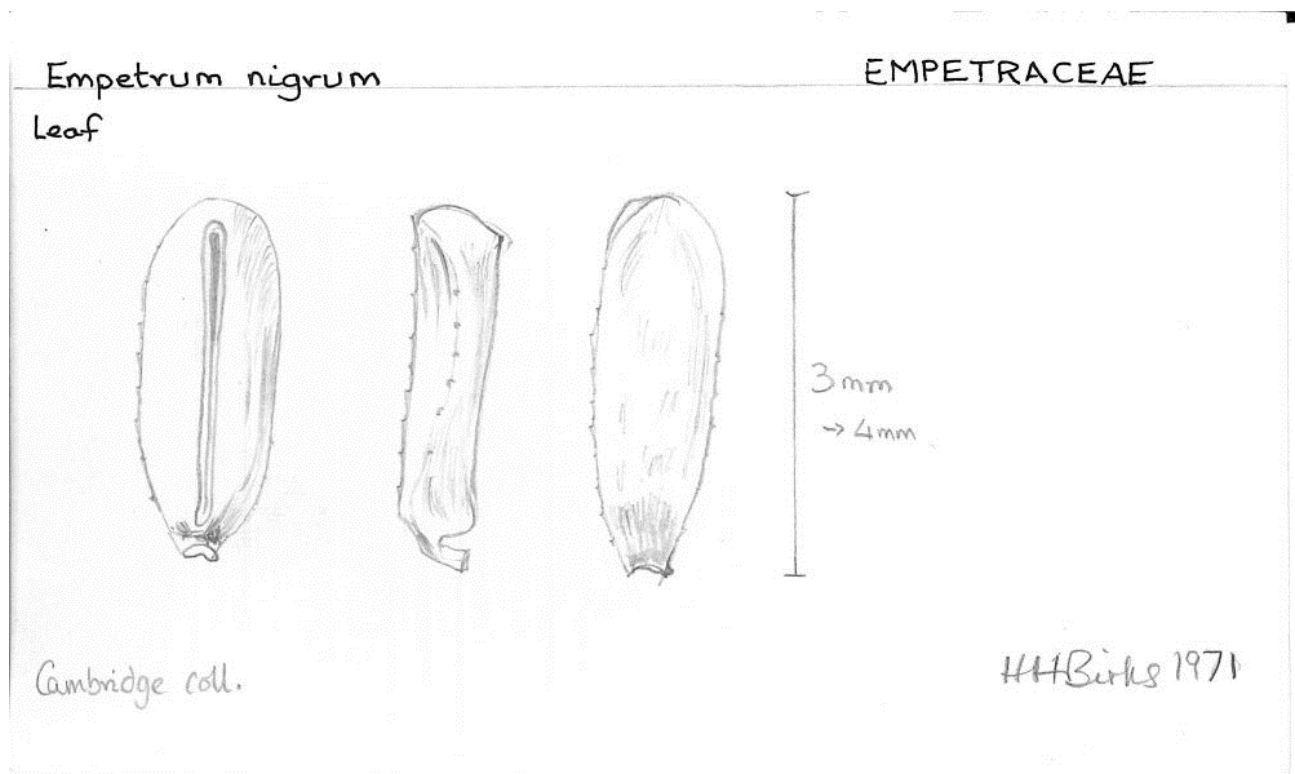
leaf. Stomata in grooves between veins



HH Birks 1970

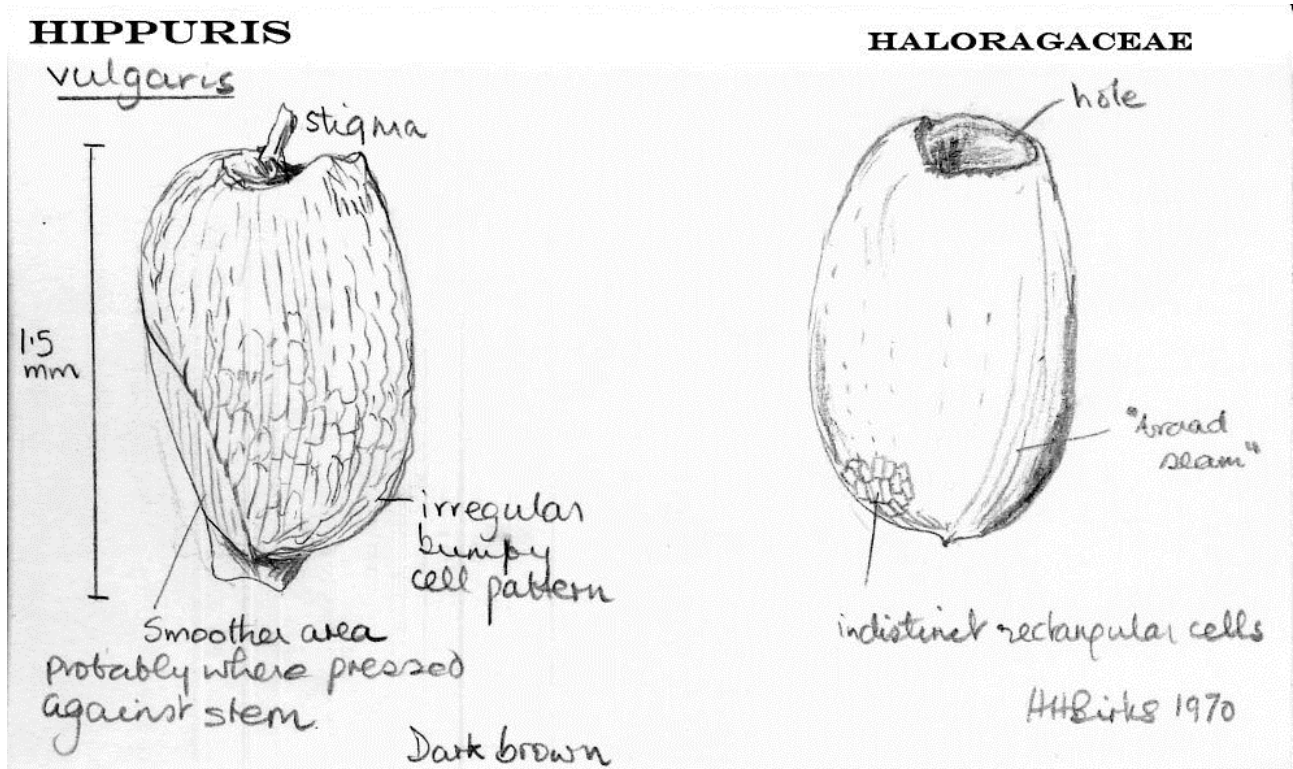
EMPETRACEAE

Empetrum nigrum



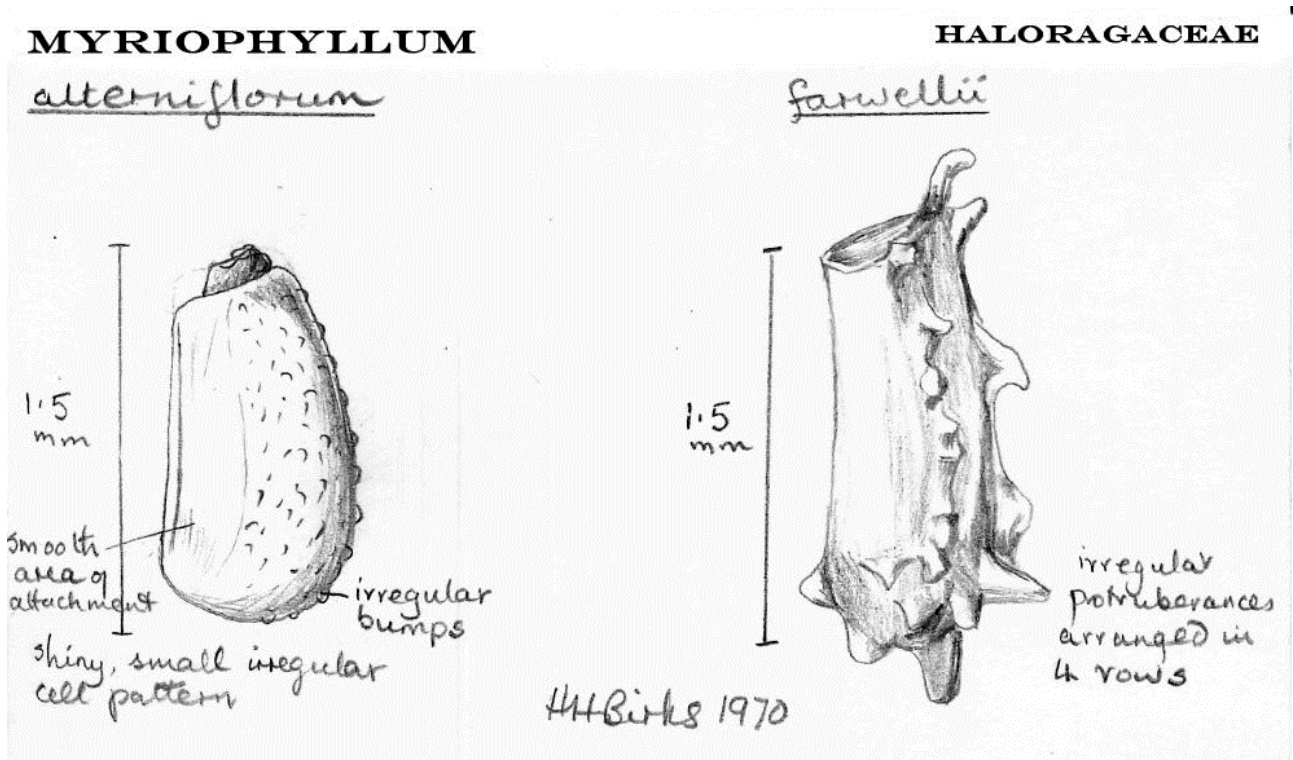
HALORAGACEAE

Hippuris vulgaris



Myriophyllum

alterniflorum, farwellii

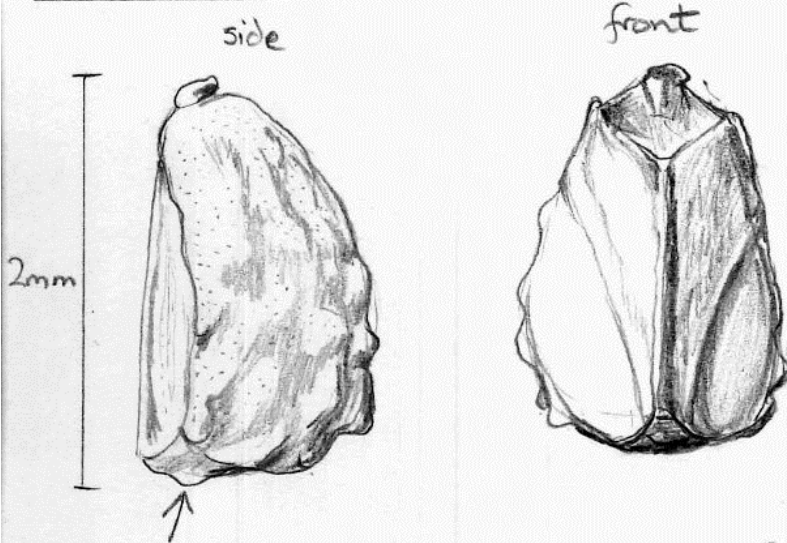


Myriophyllum exalbescens

MYRIOPHYLLUM

HALORAGACEAE

exalbescens



outer coat comes off & (similar to *M. spicatum*)
looks like *M. verticillatum* H.H. Birks 1970

Myriophyllum

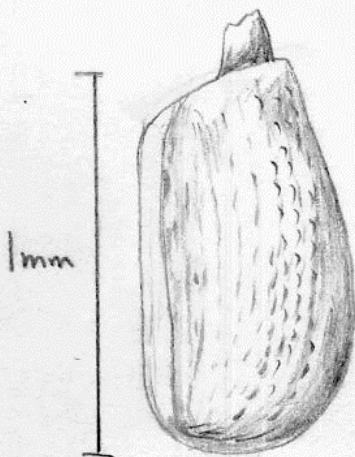
tenuellum, verticillatum var. pectinatum

MYRIOPHYLLUM

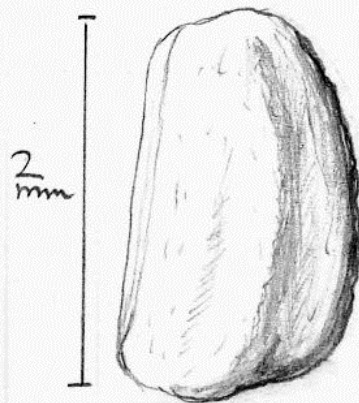
HALORAGACEAE

tenuellum

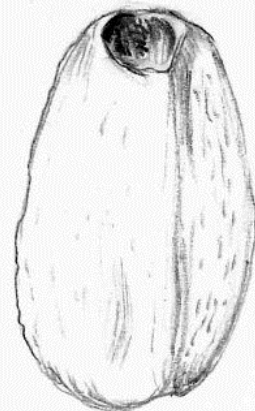
verticillatum var. pectinatum



Slightly raised cell pattern
H.H. Birks 1970



M. verticillatum is indistinguishable



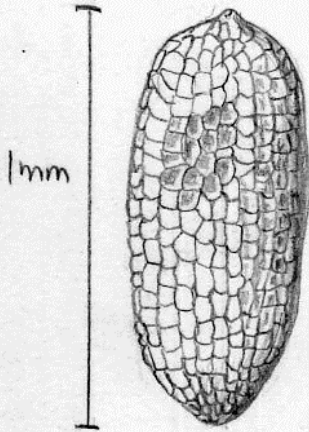
HYPERICACEAE

Hypericum virginicum

HYPERICUM

HYPERICACEAE

virginicum



distinct cell pattern
with raised walls

Other *Hypericum* spp. are generally similar

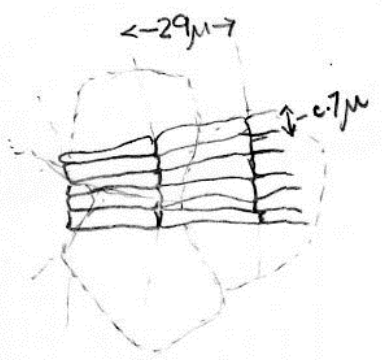
HHB:ks 1970

JUNCACEAE

Juncus acutiflorus

JUNCUS ACUTIFLORUS SEED

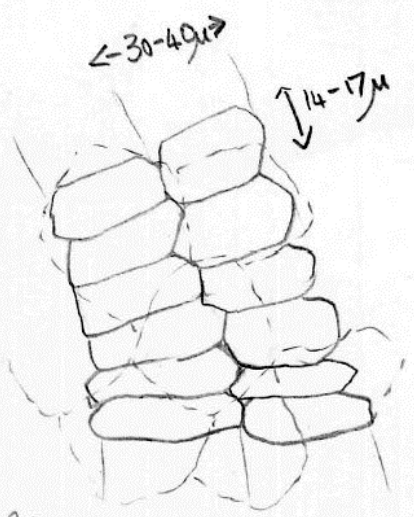
also *J. articulatus*



HH Birks 1970

Juncus effusus & *J. conglomeratus*

JUNCUS EFFUSUS AND J. CONGLOMERATUS



HH Birks 1970

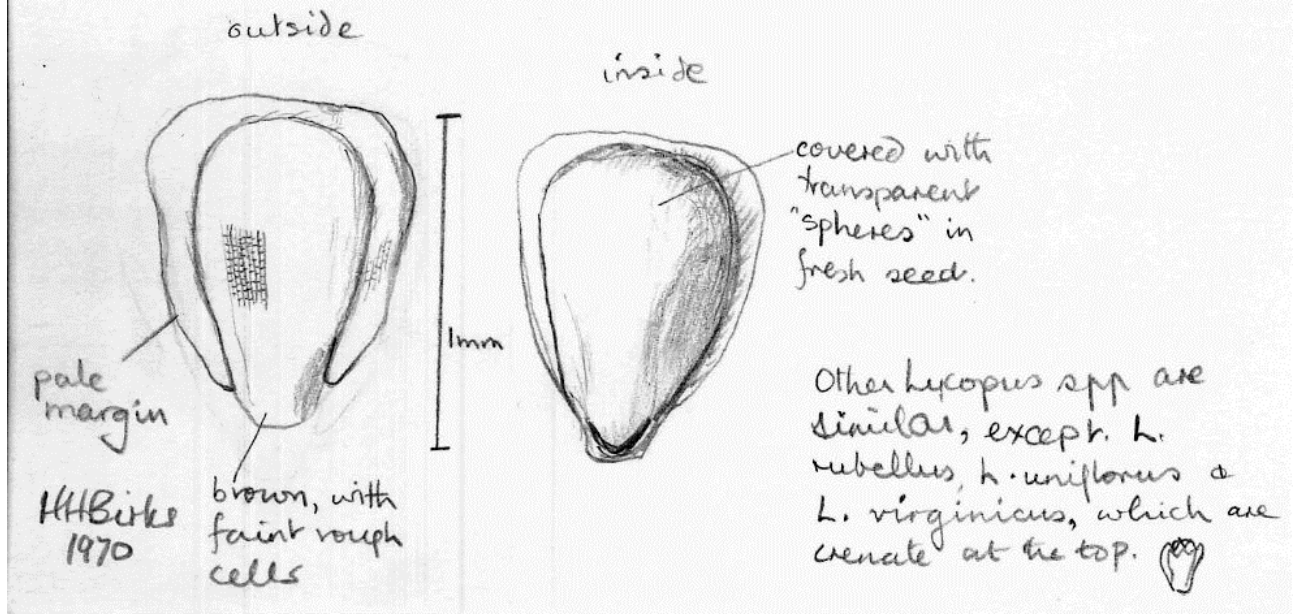
LABIATAE

Lycopus americanus

LYCOPUS

LABIATEAE

americanus

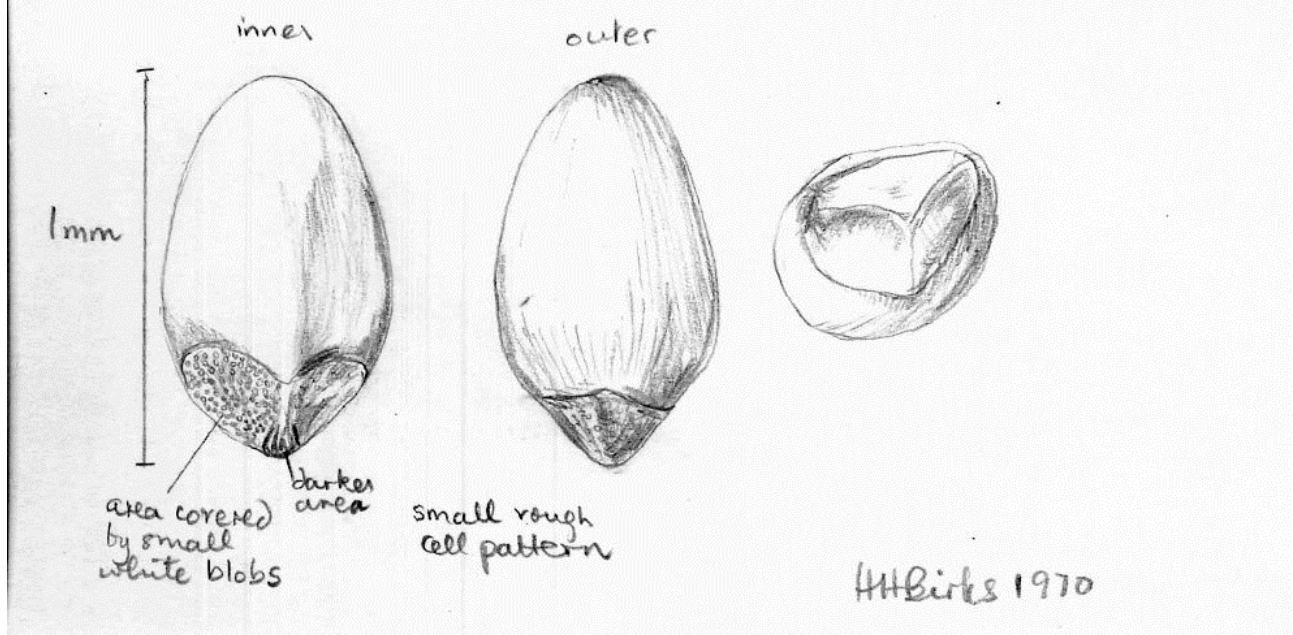


Mentha arvensis

MENTHA

LABIATEAE

arvensis

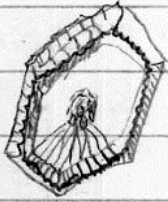


LENTIBULARIACEAE

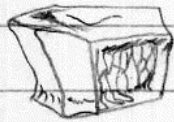
Utricularia vulgaris

LENTIBULARIACEAE

UTRICULARIA vulgaris



c. 0.5 mm

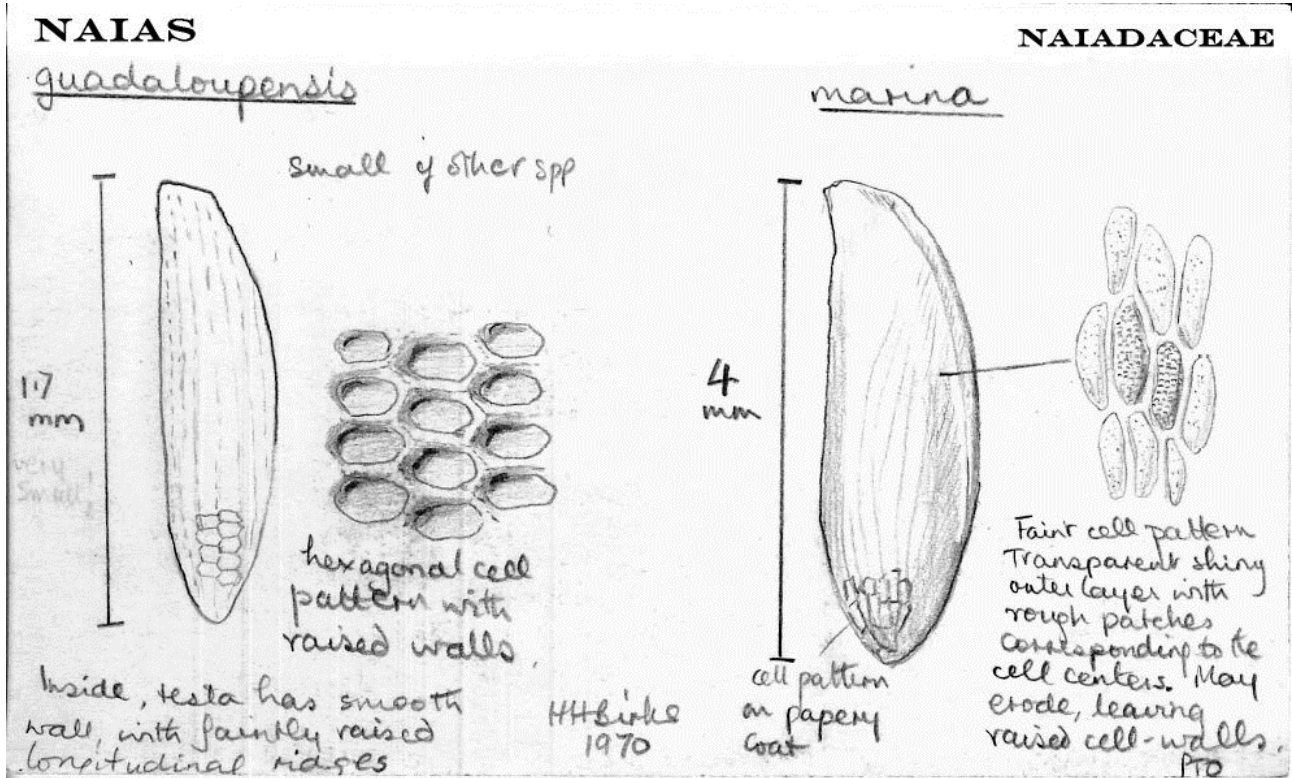


H.H. Birke 1970

NAIADACEAE

Najas

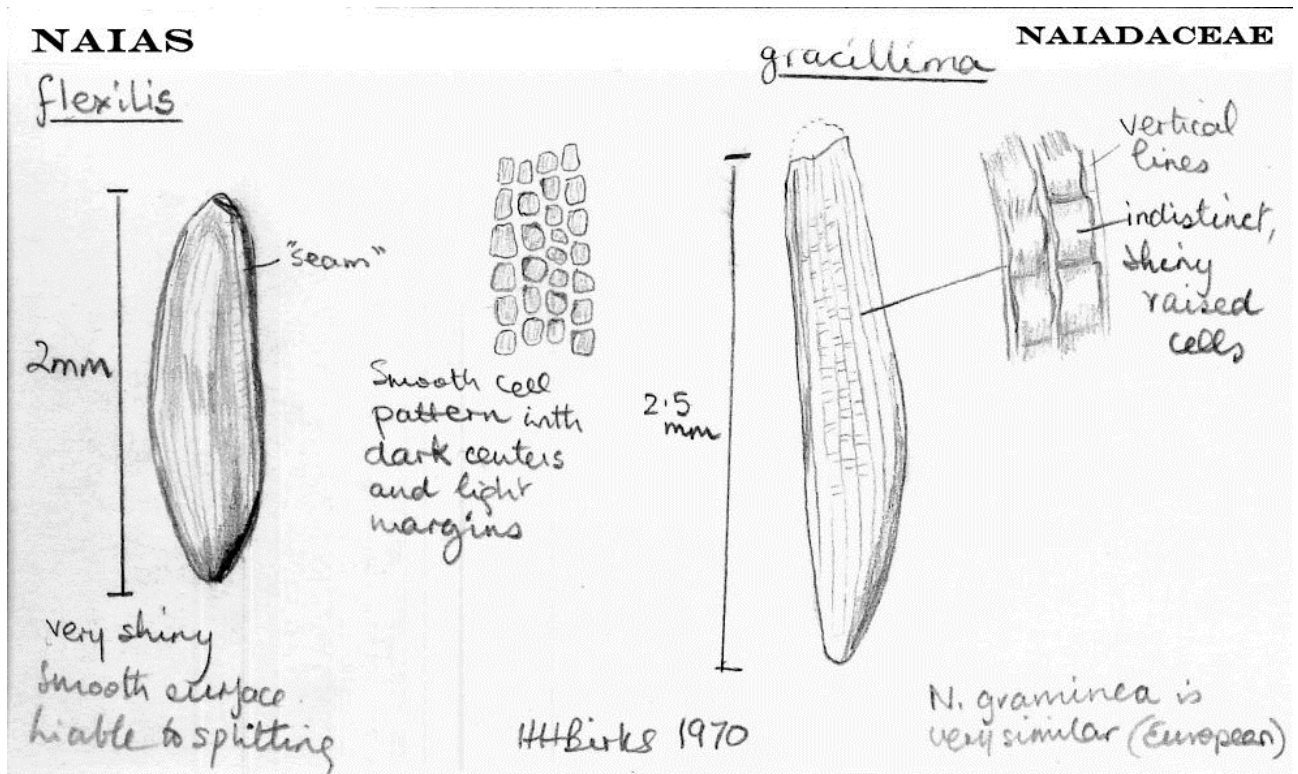
guadaloupensis, marina



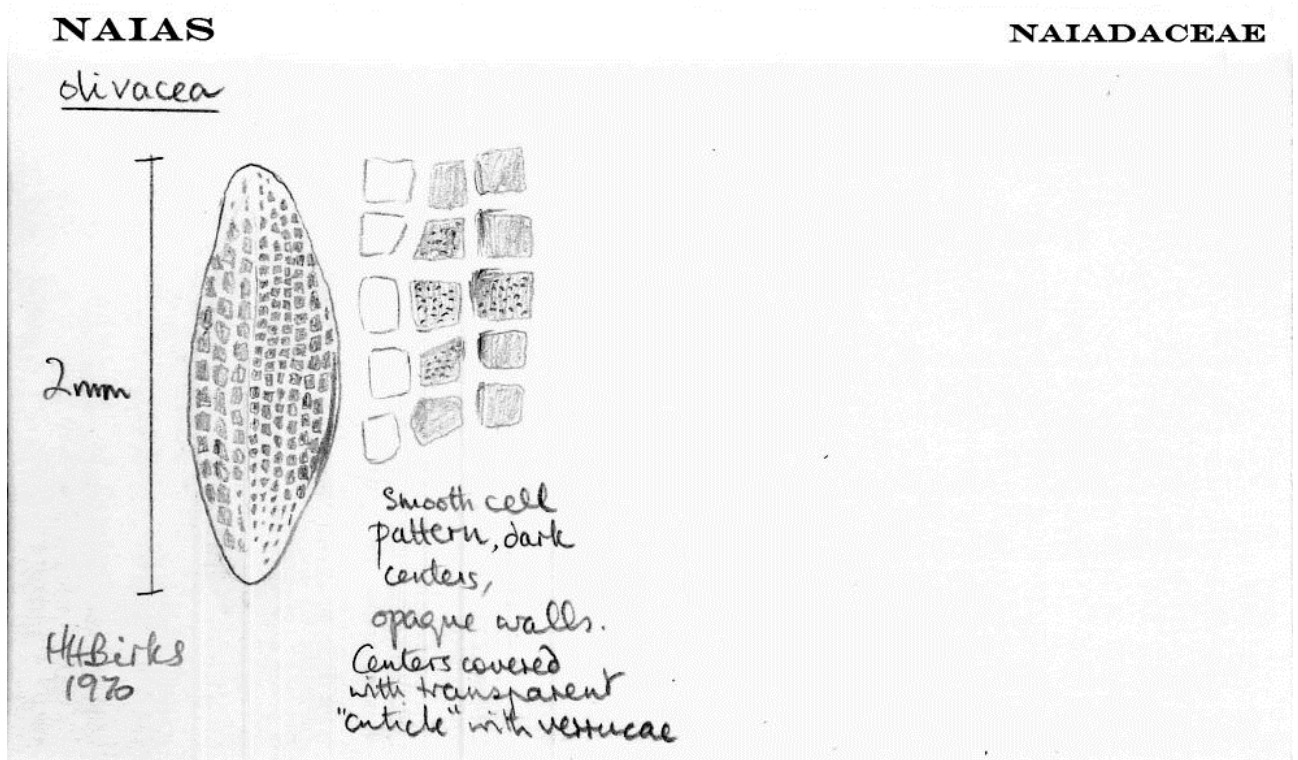
seed testa has well marked ridge-like cells

Najas

flexilis, gracillima

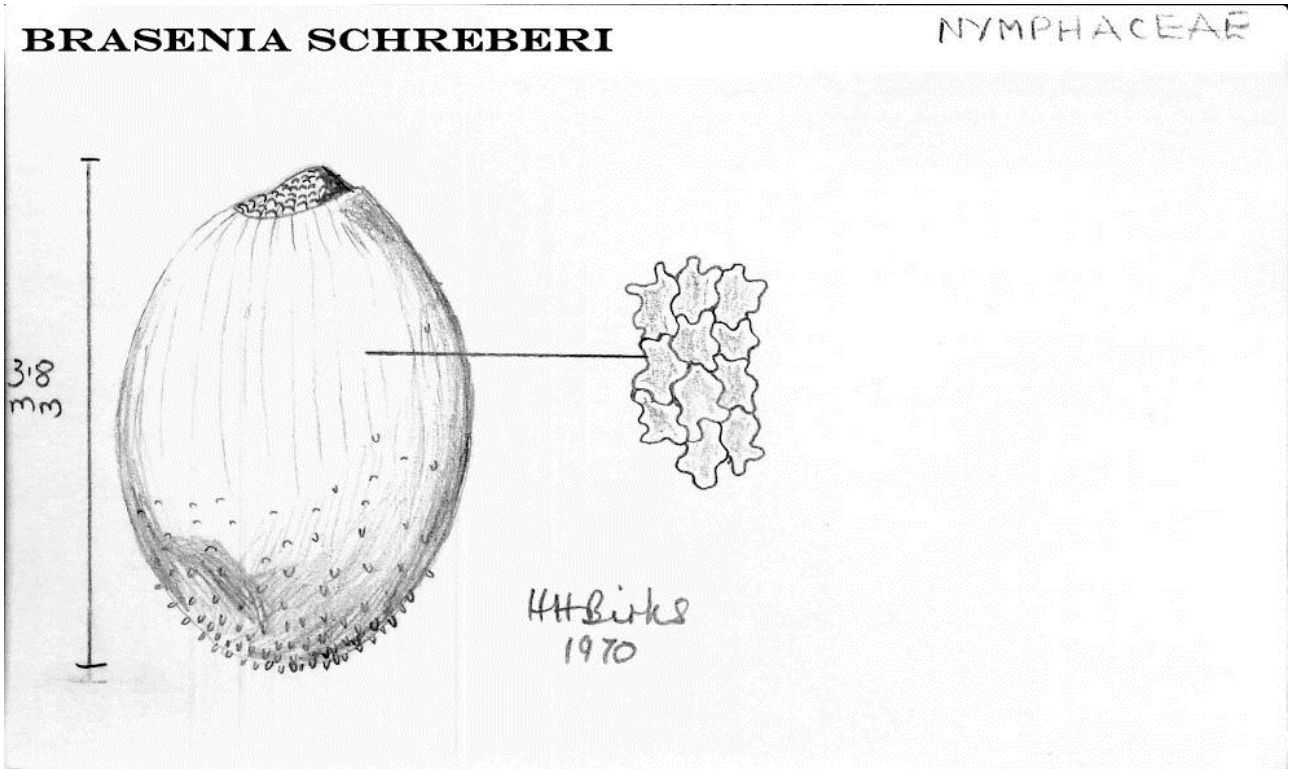


Najas olivacea

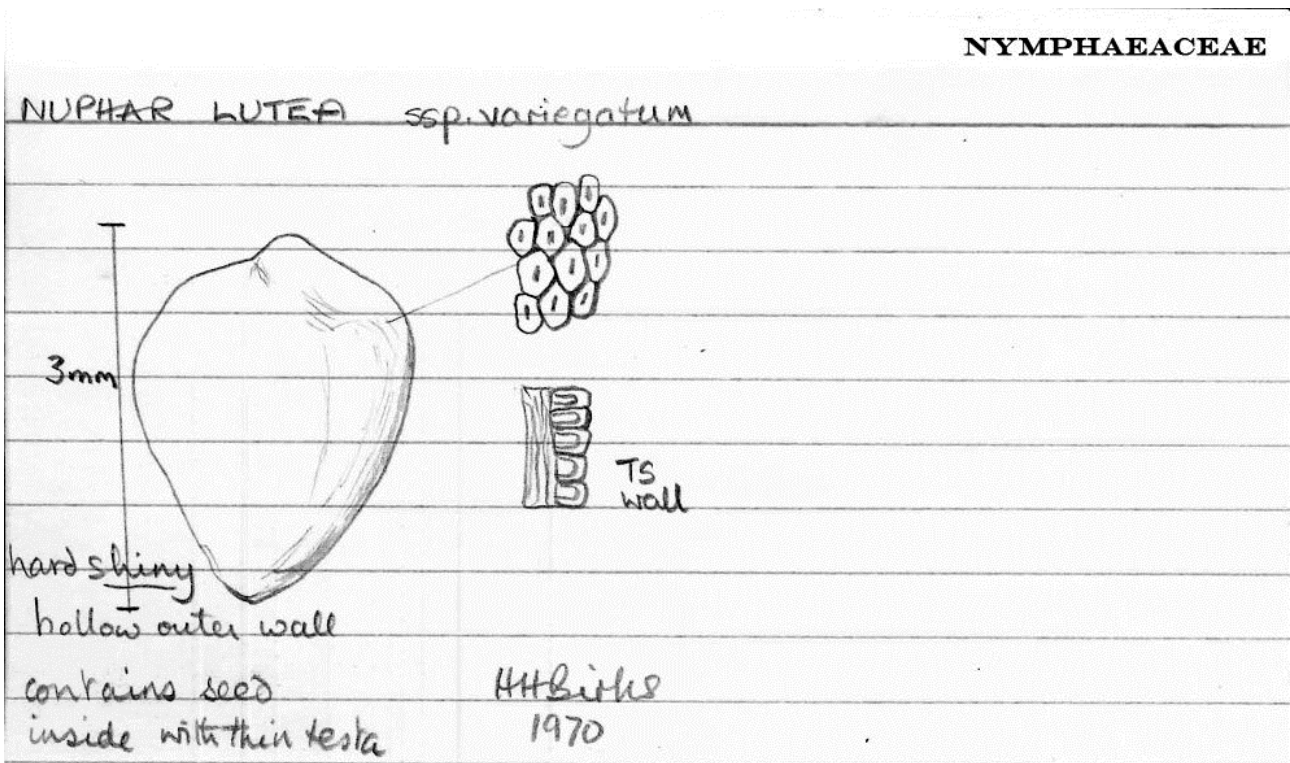


NYMPHAEACEAE

Brasenia schreberi



Nuphar lutea ssp. variegatum

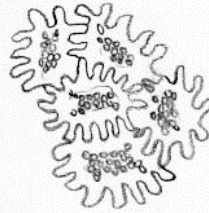
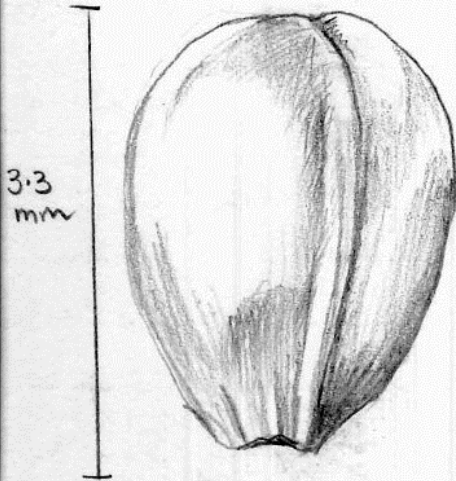


Nymphaea tuberosa

NYMPHAEAE

NYMPHAEACEAE

tuberosa



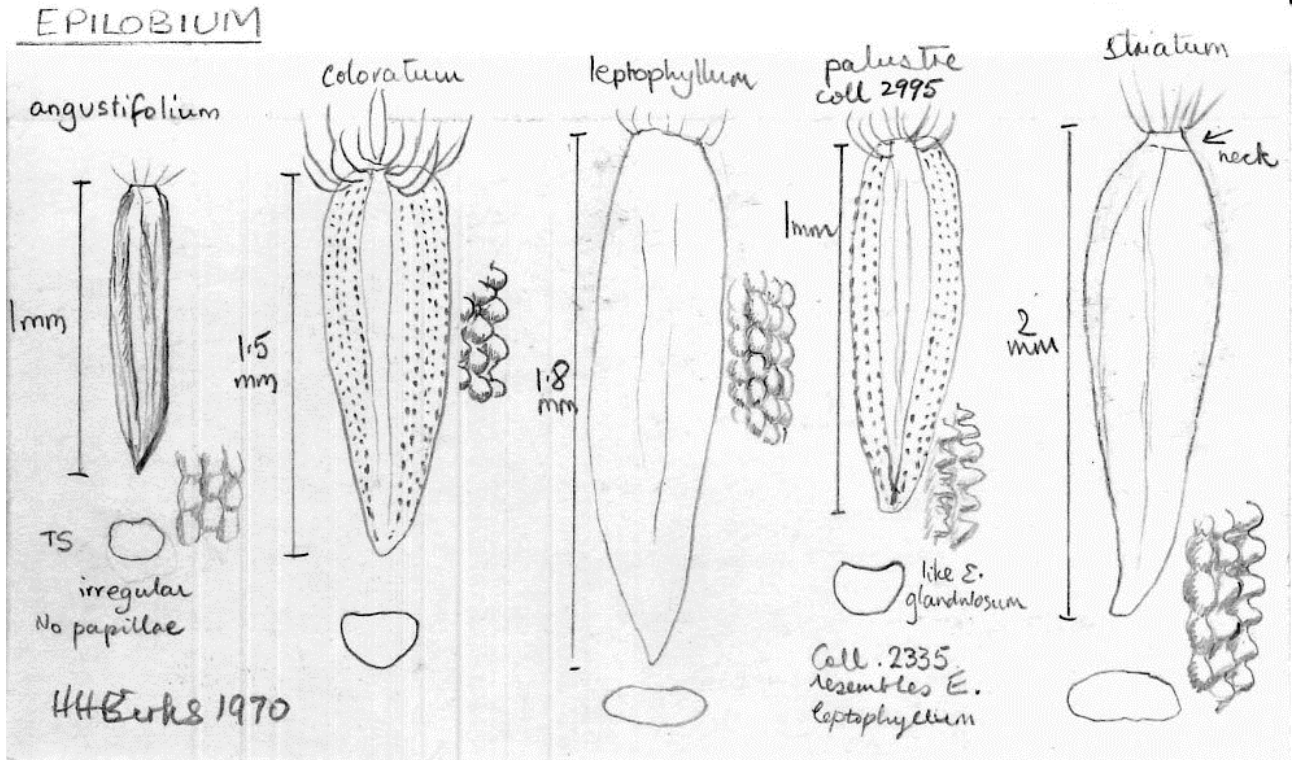
shiny surface
cells, almost invisible

HH Birks 1970

ONAGRACEAE

Epilobium

angustifolium, coloratum, leptophyllum, palustre, strictum



E. angustifolium. Similar size to *E. glandulosum*, but seeds in cell immature. No papillae

E. coloratum 1.3-1.5mm. Papillae not so long, rounded, and regularly arranged but not in rows. like var. *adenocaulon*.

E. leptophyllum 1.8mm Protruding cells ~~~~~. Rather flattened, but may be poorly developed

E. palustre 1.5mm. Like *E. leptophyllum*. Flattened

E. strictum 1.5-2mm. Like *E. palustre*

2 main types: 1) symmetrical on both sides
E. angustifolium
E. leptophyllum
E. strictum

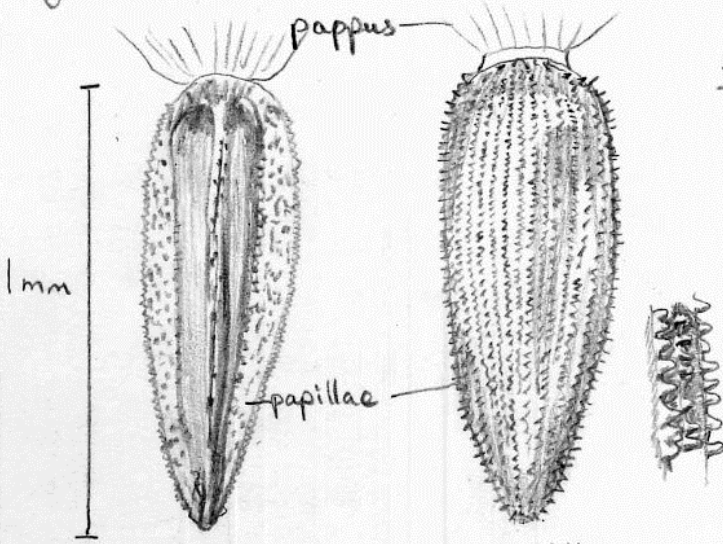
2) one side with "seam"
E. glandulosum
E. coloratum
E. palustre p.p.

Epilobium glandulosum

EPILOBIUM

ONAGRACEAE

glandulosum



E. glandulosum var. *adenocaulon*
1.3-1.5 mm, larger, rounded
papillae not forming rows
discrete rows, but regularly
arranged.

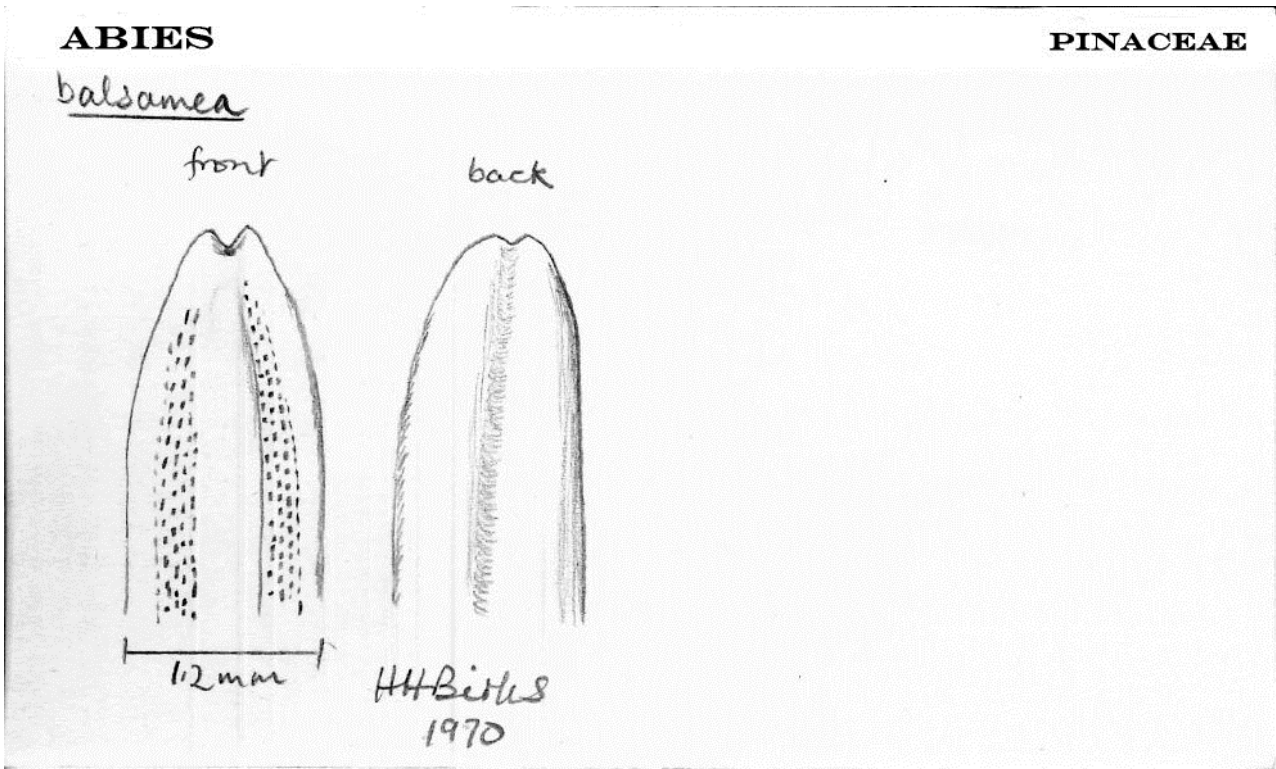
HHBirk 1970

rows of papillae

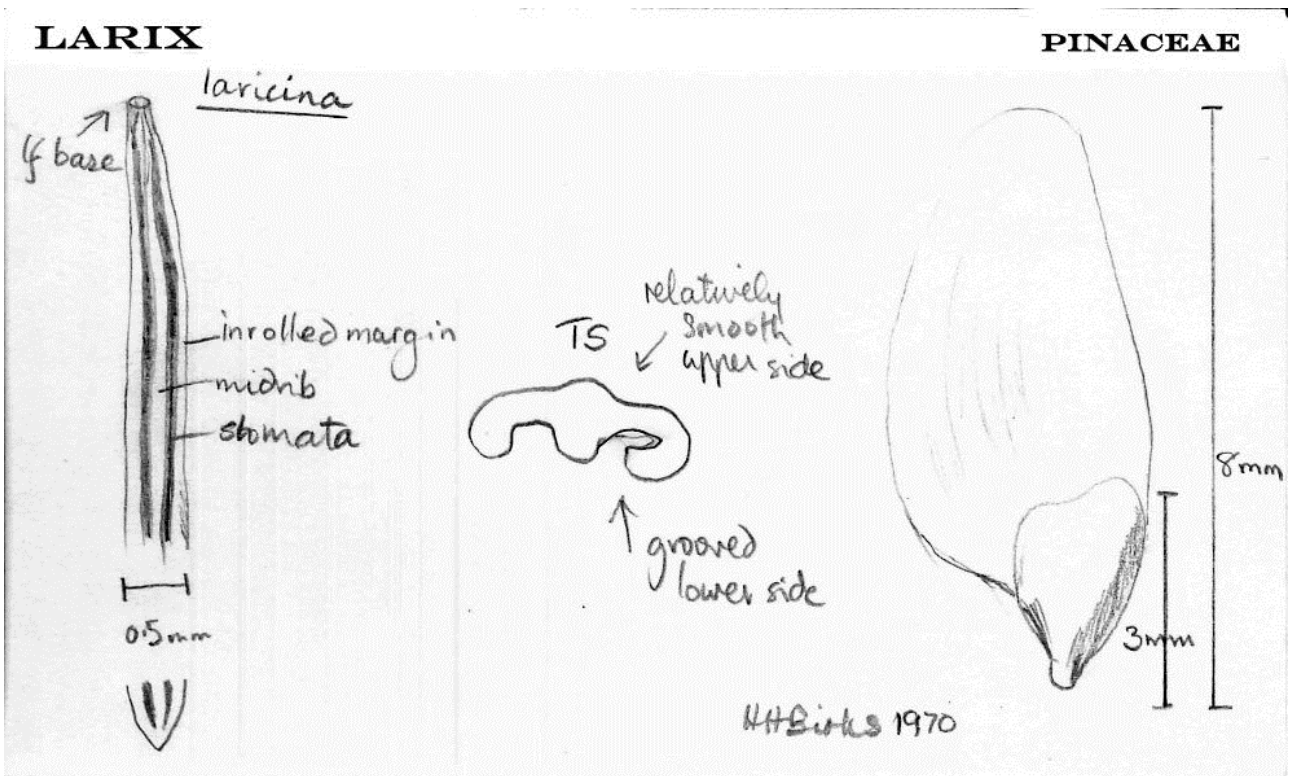
PTO

PINACEAE

Abies balsamea

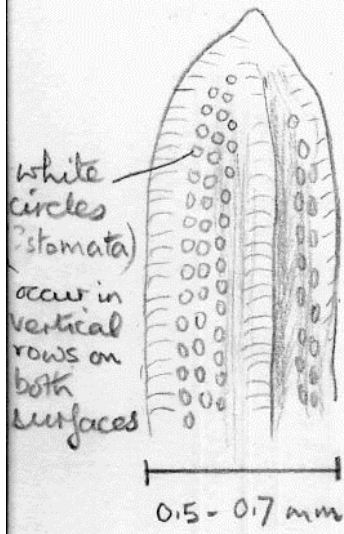


Larix laricina



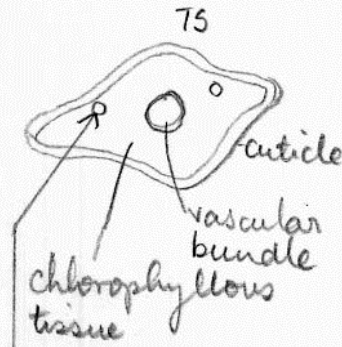
Picea

PICEA



PINACEAE

P. glauca and P. mariana are both very similar, and variable in pointedness & number of rows of stomata.

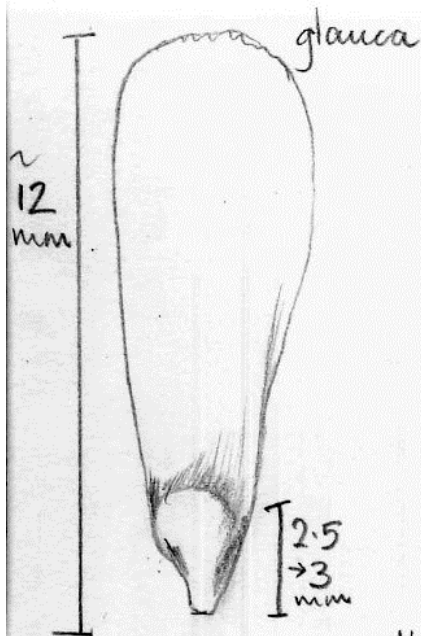


resin ducts present only in P. mariana. Present through almost whole length.

HH Birks 1970

Picea glauca

PICEA



PINEACEAE

P. mariana seeds and cones are smaller

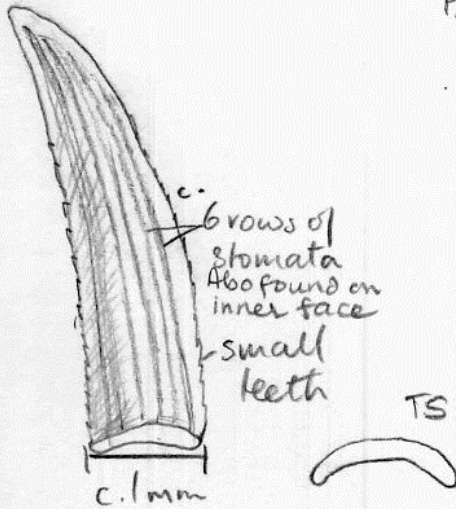
HH Birks 1970

Pinus banksiana

PINUS

PINACEAE

banksiana



c.
6 rows of
stomata
Also found on
inner face
small
teeth

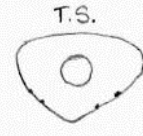
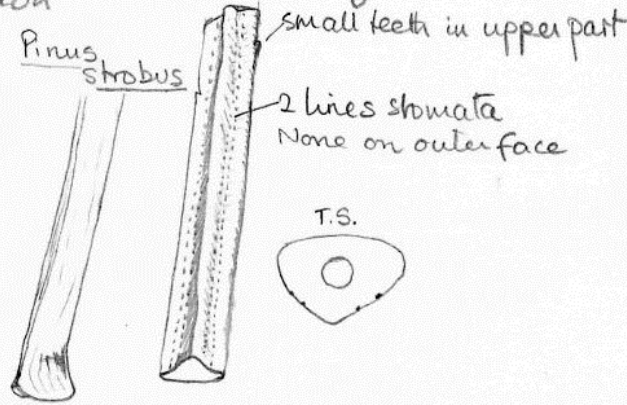
c. 1mm

TS

Similar rows of stomata
on back

Pinus resinosa is similar - see Watts.

P. strobus is narrower, with more
distant teeth & triangular cross
section



HH Birks 1970

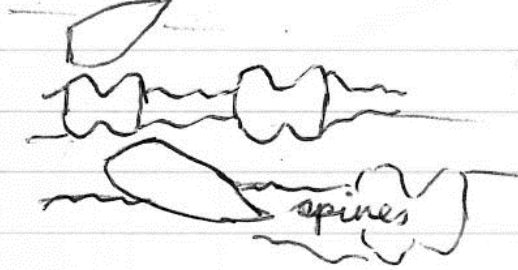
POACEAE

Molinia caerulea

MOLINIA CAERULEA

leaf.

on vein:



large thin-walled cells
between veins & small
inconspicuous stomata

H.H. Bites 1971

POLYGONACEAE

Polygonum

'Flak' polygonums.

P. cochineum

P. hydropiperoides

P. lapathifolium

P. pennsylvanicum

P. persicaria

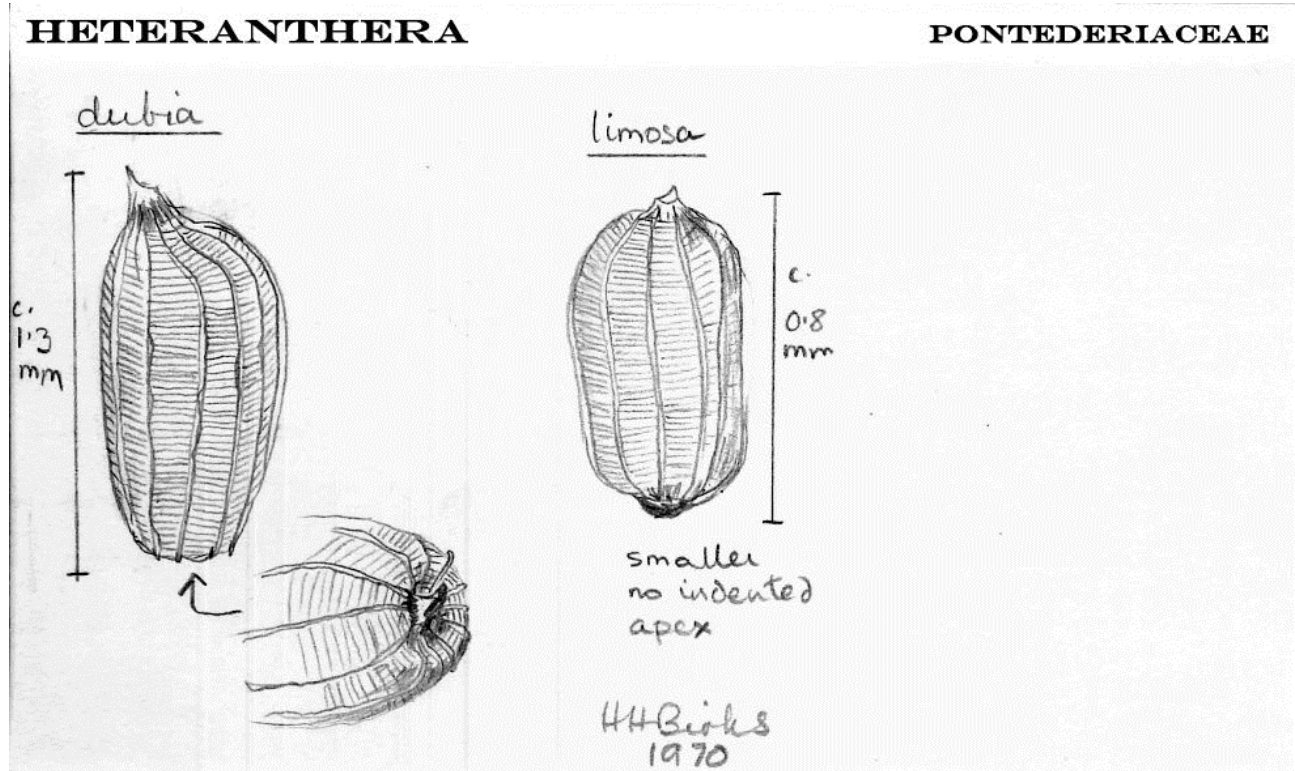
P. punctatum p.p.

P. scabrum

PONTEDERIACEAE

Heteranthera

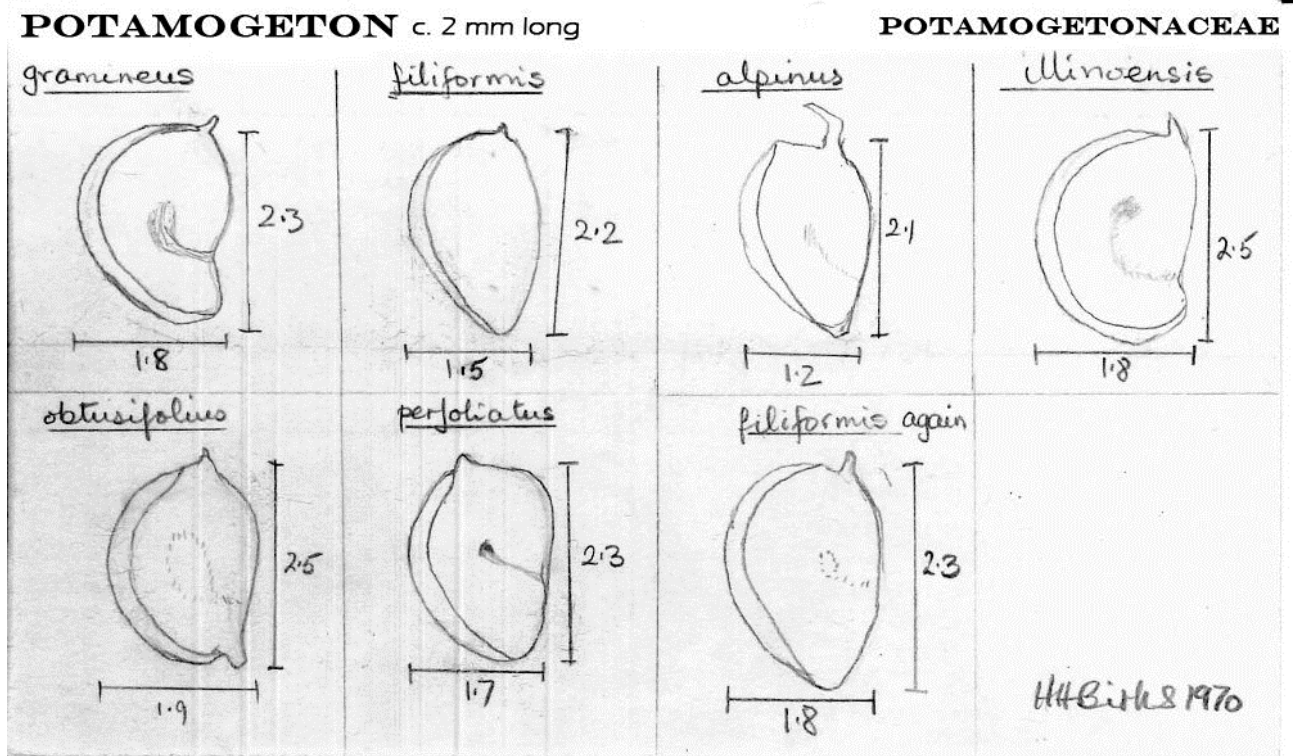
dubia, limosa



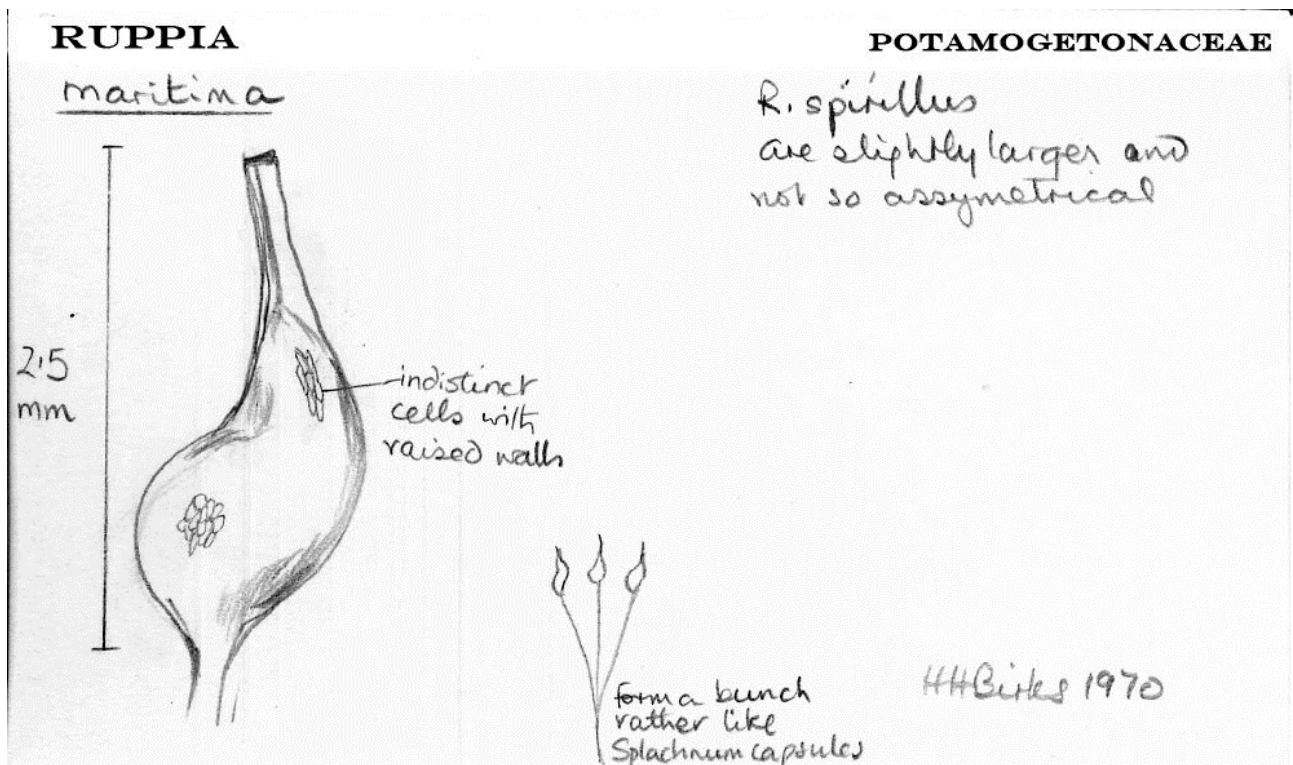
POTAMOGETONACEAE

Potamogeton

gramineus, filiformis, alpinus, illinoensis, obtusifolius, perfoliatus



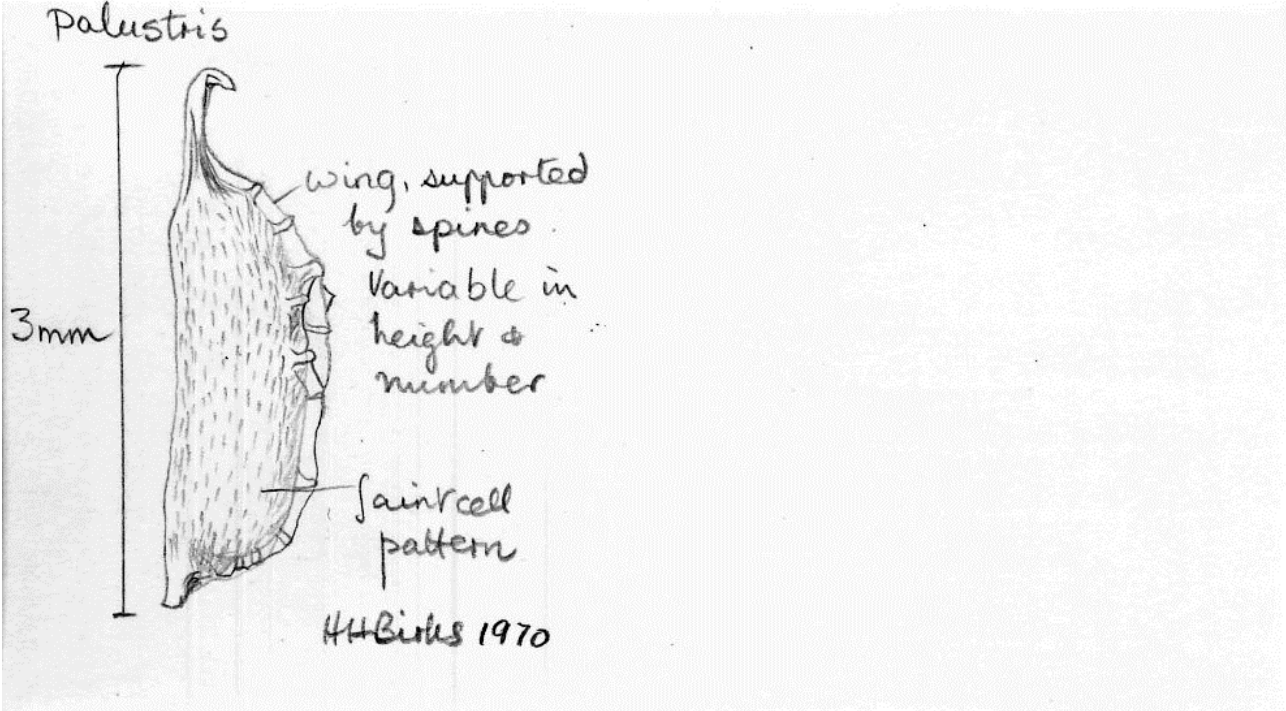
Ruppia maritima



Zannichellia palustris

ZANNICHELLIA

POTAMOGETONACEAE



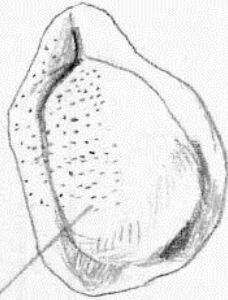
PRIMULACEAE

Lysimachia terrestris

LYSIMACHIA

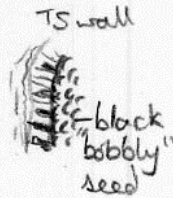
PRIMULACEAE

terrestris



deep network
with raised walls

HH Birks 1970



TS wall

black
'bobbly'
seed



3-cornered
seed with
margin
round
2 edges

L. vulgaris has similar coat,
but much smaller lum; nusi

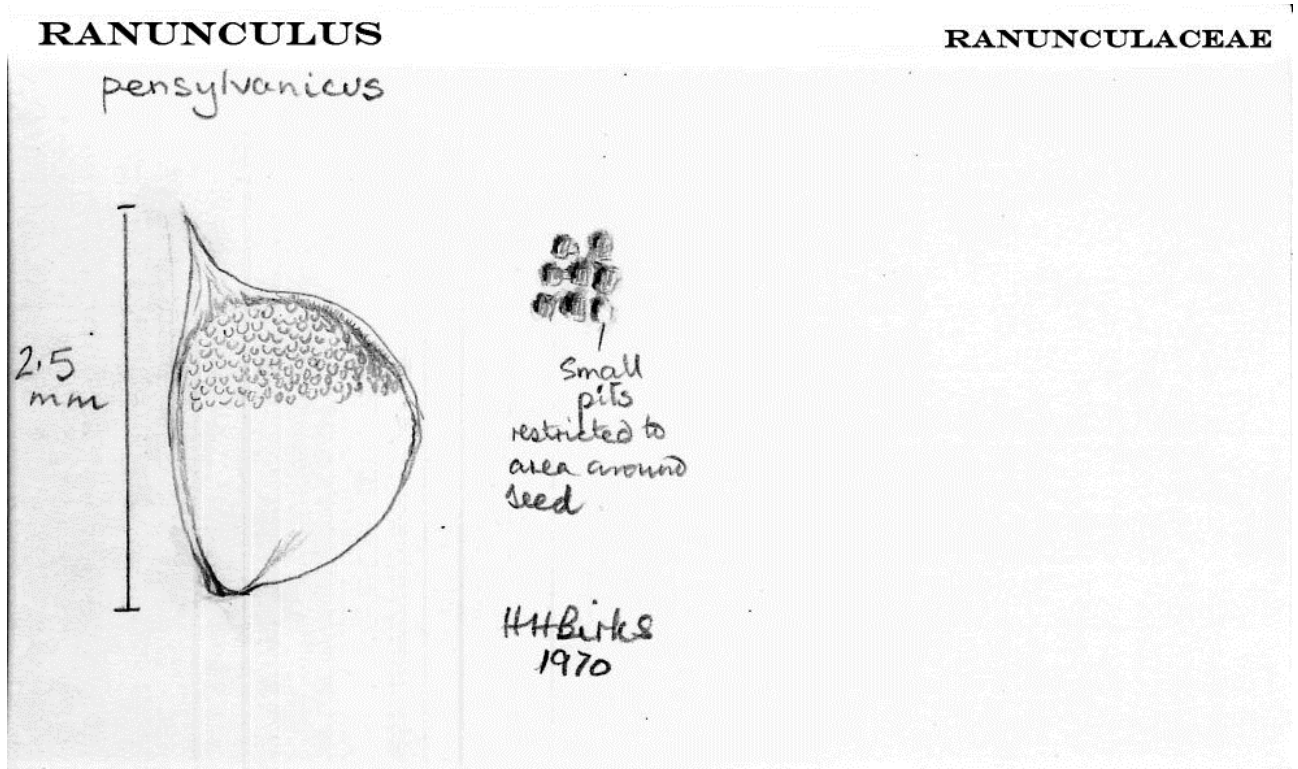
L. thyrsoiflora has less complete
reticulum, & smaller margin

L. quadrifolia does not have a
similar coat - dark brown with
large cells: angular seed

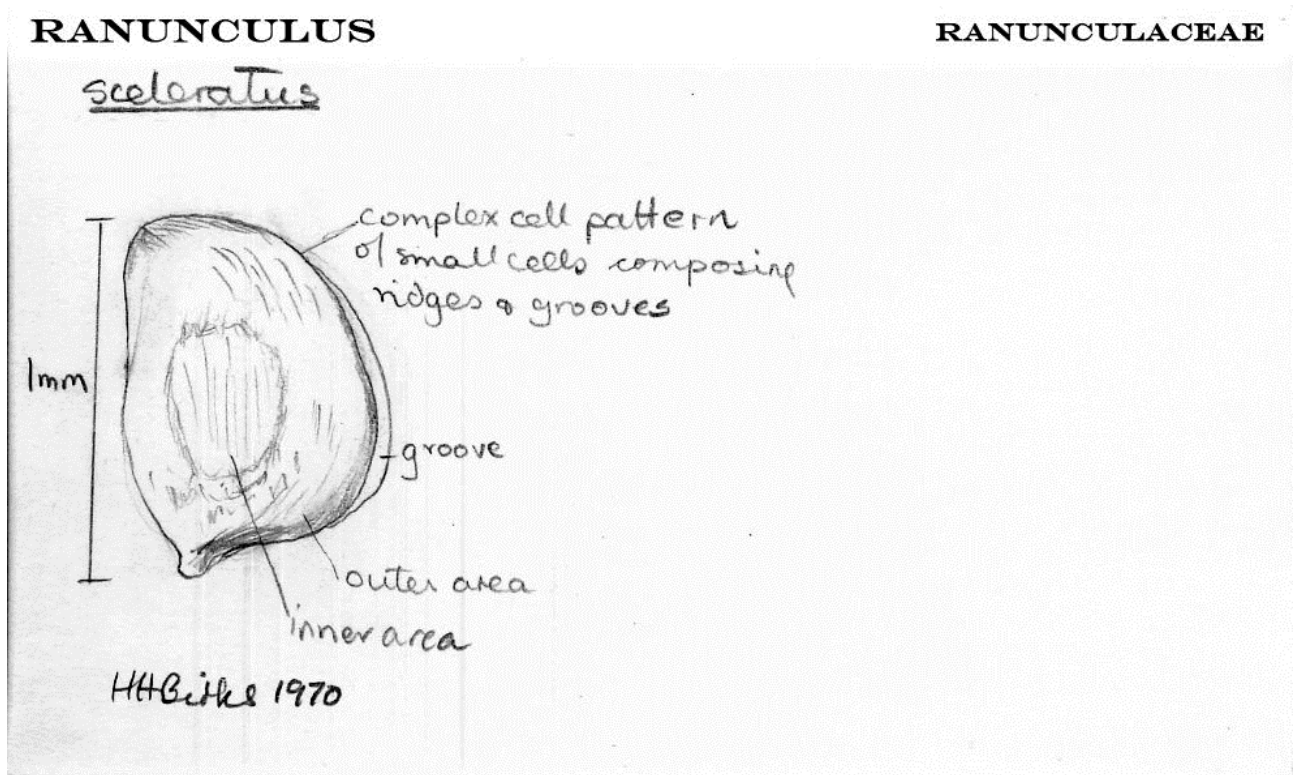
L. ciliata is similar ↑ but
larger

RANUNCULACEAE

Ranunculus pensylvanicus



Ranunculus sceleratus

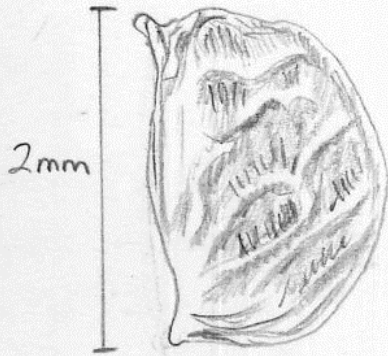


Ranunculus trichophyllus

RANUNCULUS

RANUNCULACEAE

trichophyllus



raised
ridges

H. Birkus
1970

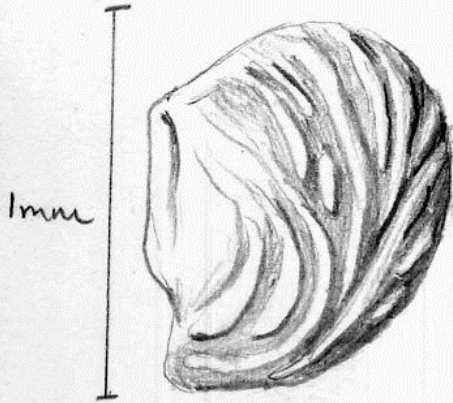
ROSACEAE

Potentilla norvegica

POTENTILLA

ROSACEAE

norvegica



irregular small rough cells with slightly raised walls

HH Birks
1970

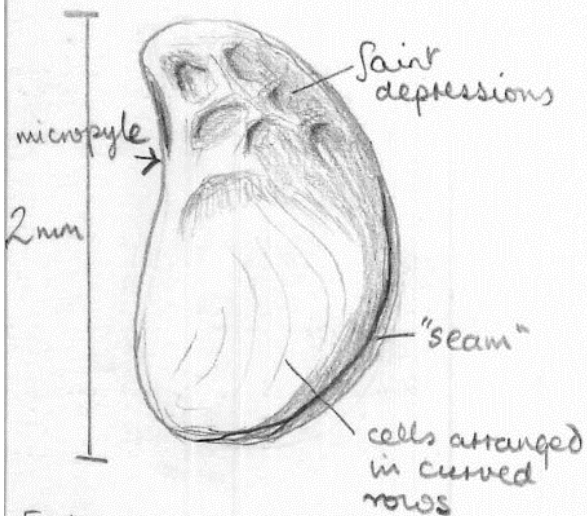
Rubus pubescens

RUBUS

ROSACEAE

pubescens

boiled KOH



Fresh seed covered by thin coat which is mucilaginous when wet.

HH Birks
1970

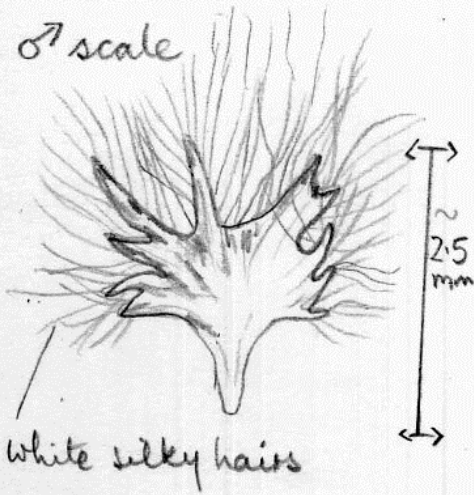
SALICACEAE

Populus tremuloides

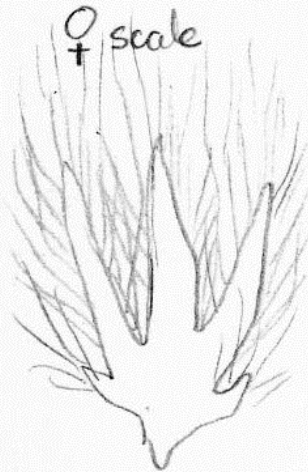
POPULUS

tremuloides

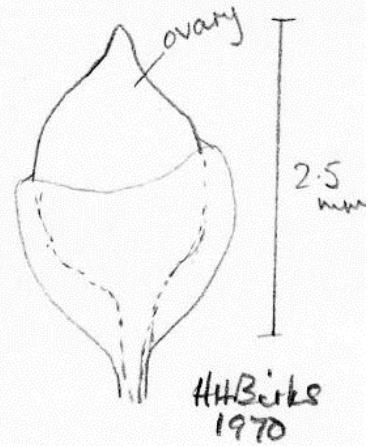
♂ scale



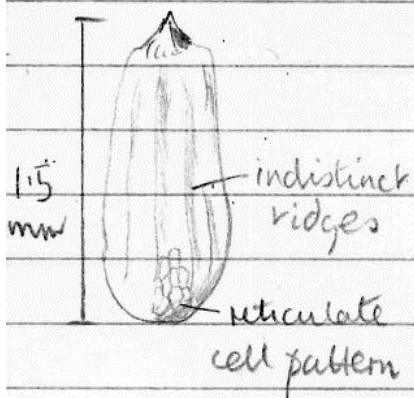
♀ scale



Young ♀ ovary



PTO



P. balsamifera similar but
less marked cell pattern
& hooked hairs on surface HHBikes 1970

Salix lucida

SALIX

SALICACEAE

lucida

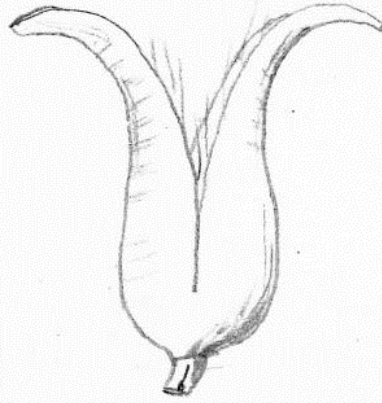
~ 1.5 mm



ring of long hairs attached here

like Typha, but not shiny
& rather crumpled
& larger

capsule

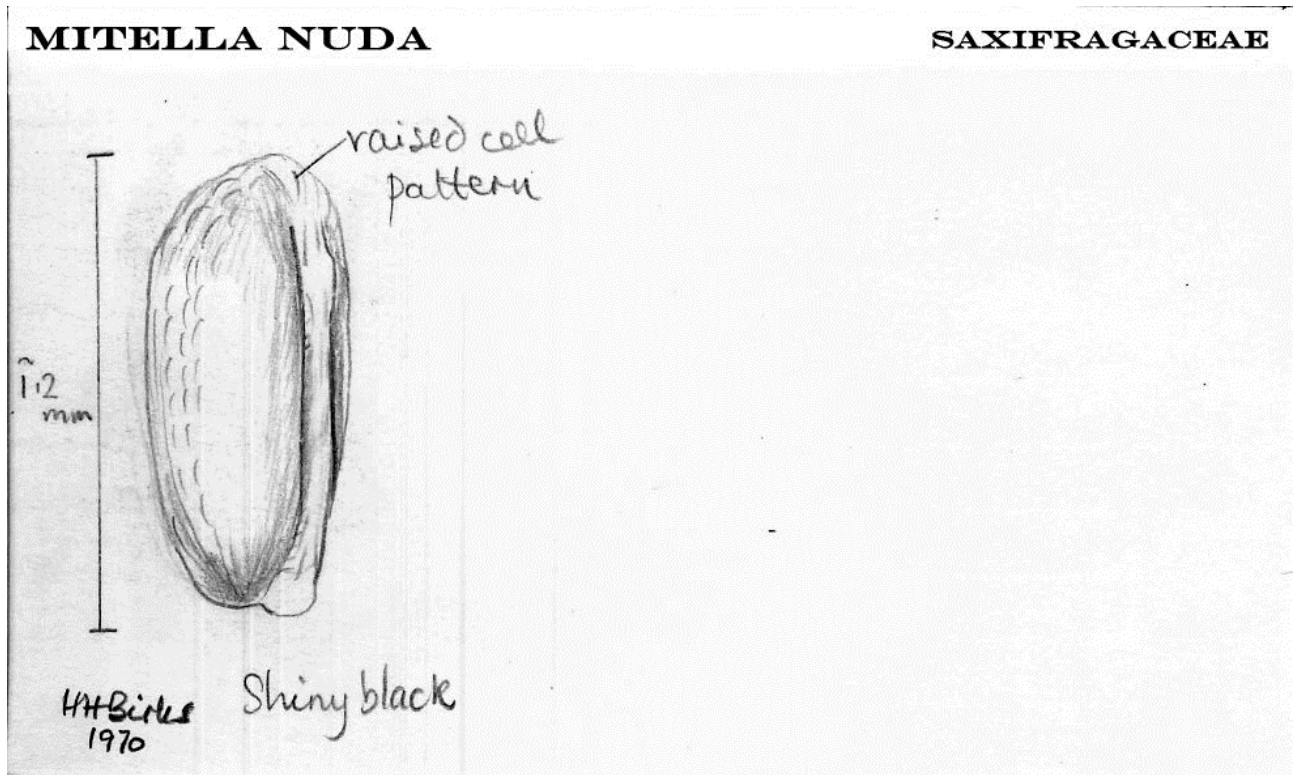


7mm

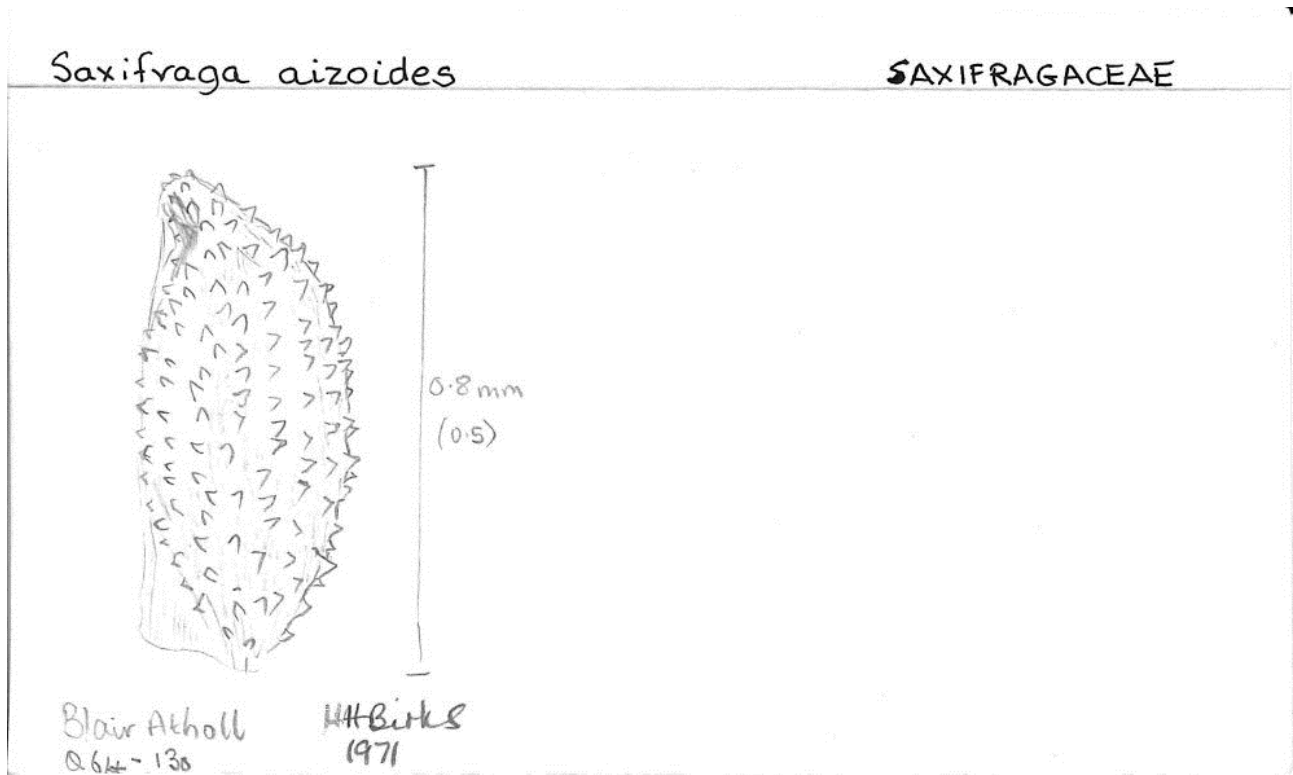
H. Birkb. 1970

SAXIFRAGACEAE

Mitella nuda



Saxifraga aizoides

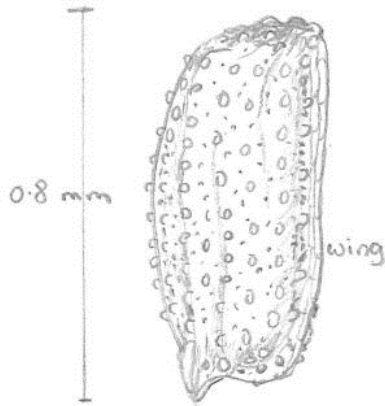


Saxifraga hypnoides

Saxifraga hypnoides

SAXIFRAGACEAE

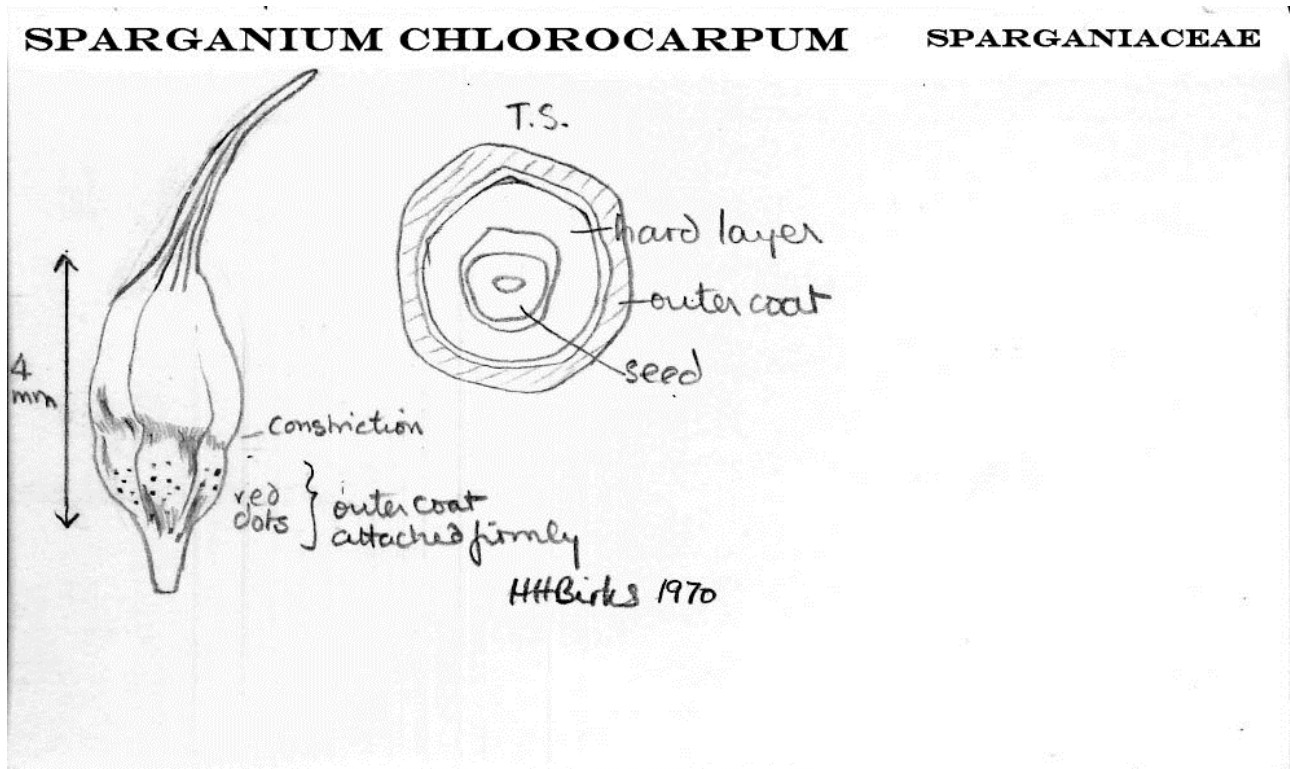
large papillae in \pm longitudinal rows
very small papillae in between



H.H. Birks 1971

SPARGANIACEAE

Sparganium chlorocarpum



Similar fruits occur in *S. americanum*

S. androcladum

S. angustifolium

S. fluctuans

S. glomeratum

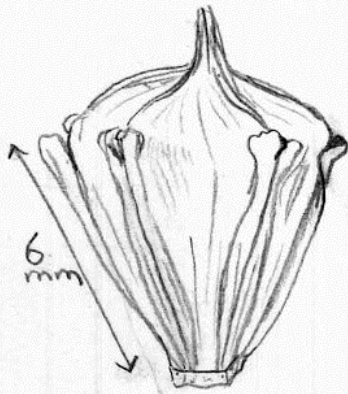
S. minimum

May be separable on size, and ribbing of inner hard layer

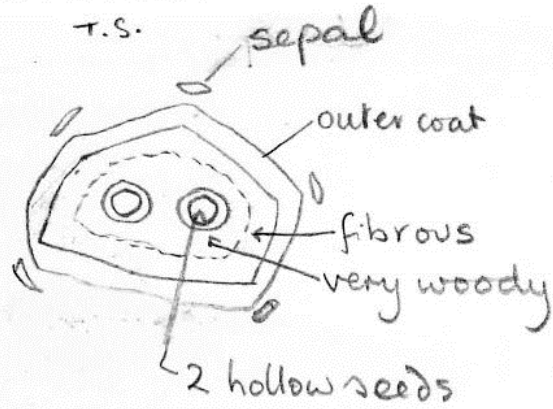
Sparganium eurycarpum

SPARGANIUM EURYCARPUM

SPARGANIACEAE



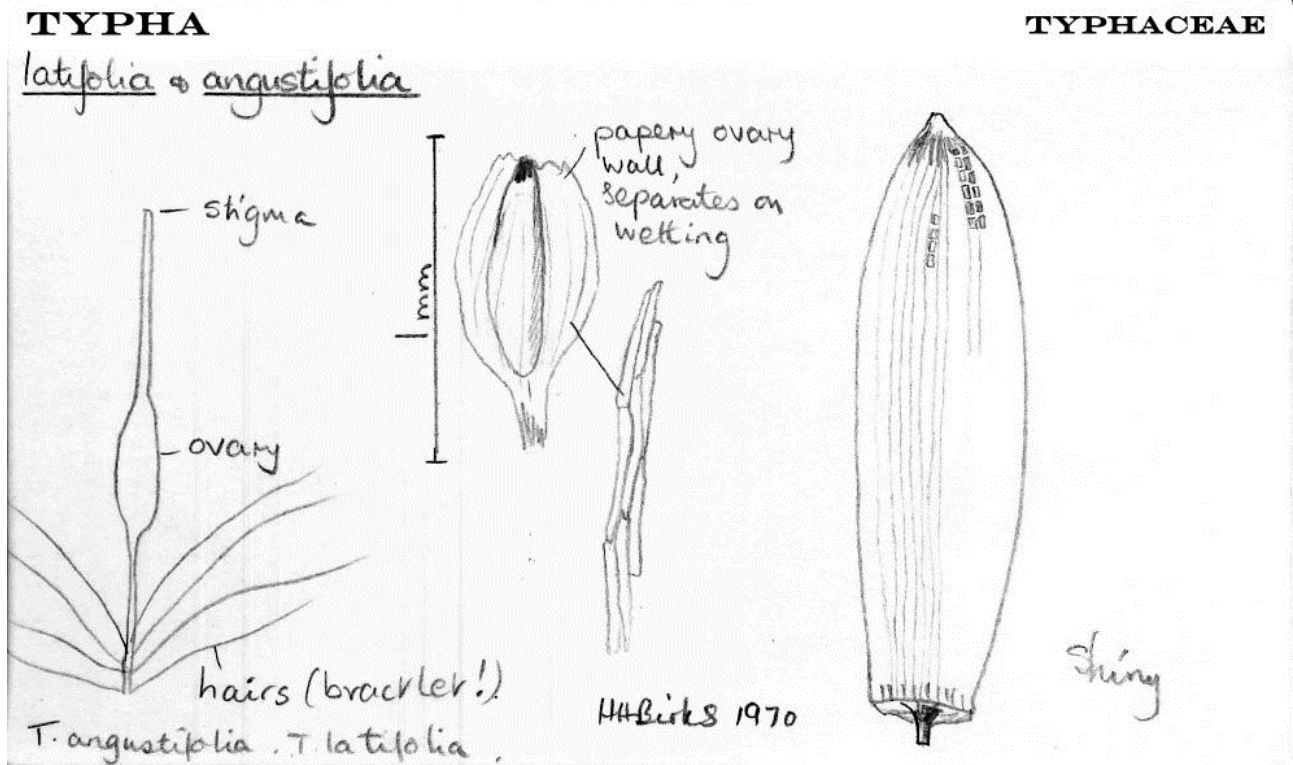
HH Birks 1970



TYPHACEAE

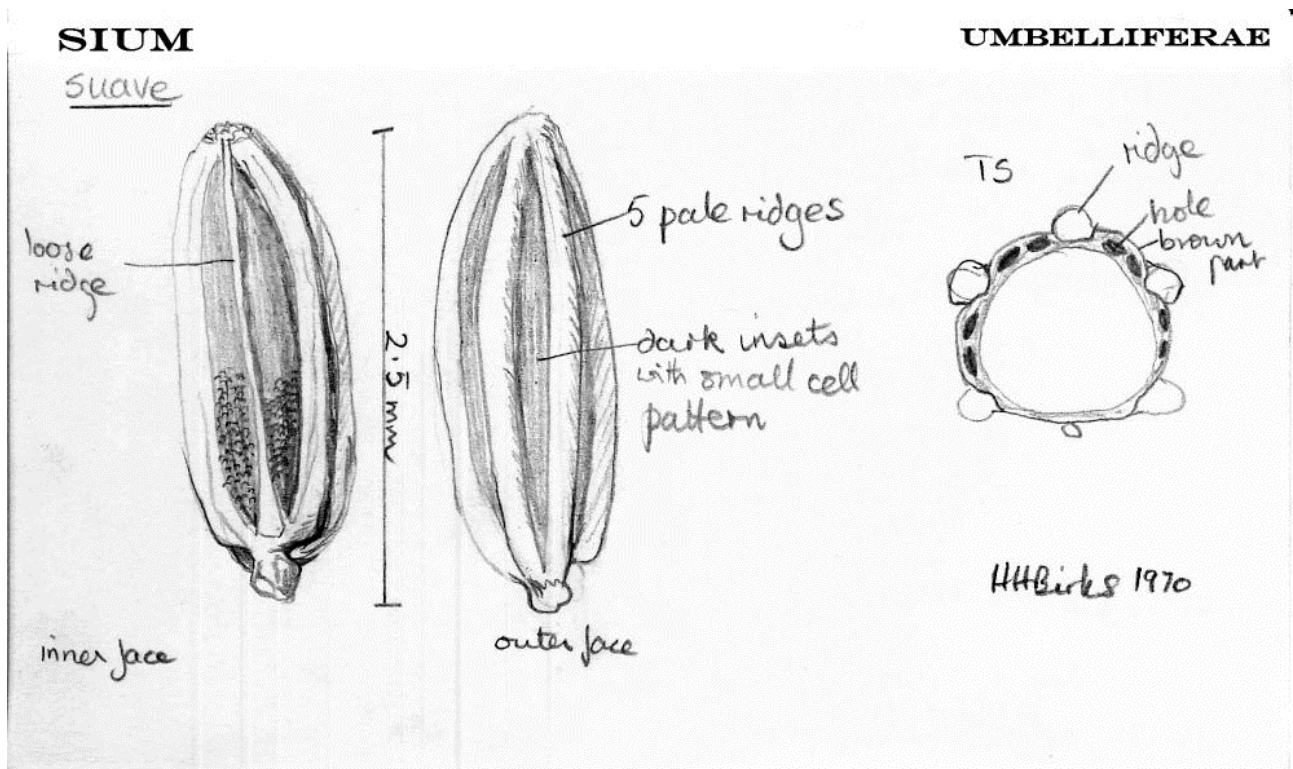
Typha

latifolia & *angustifolia*



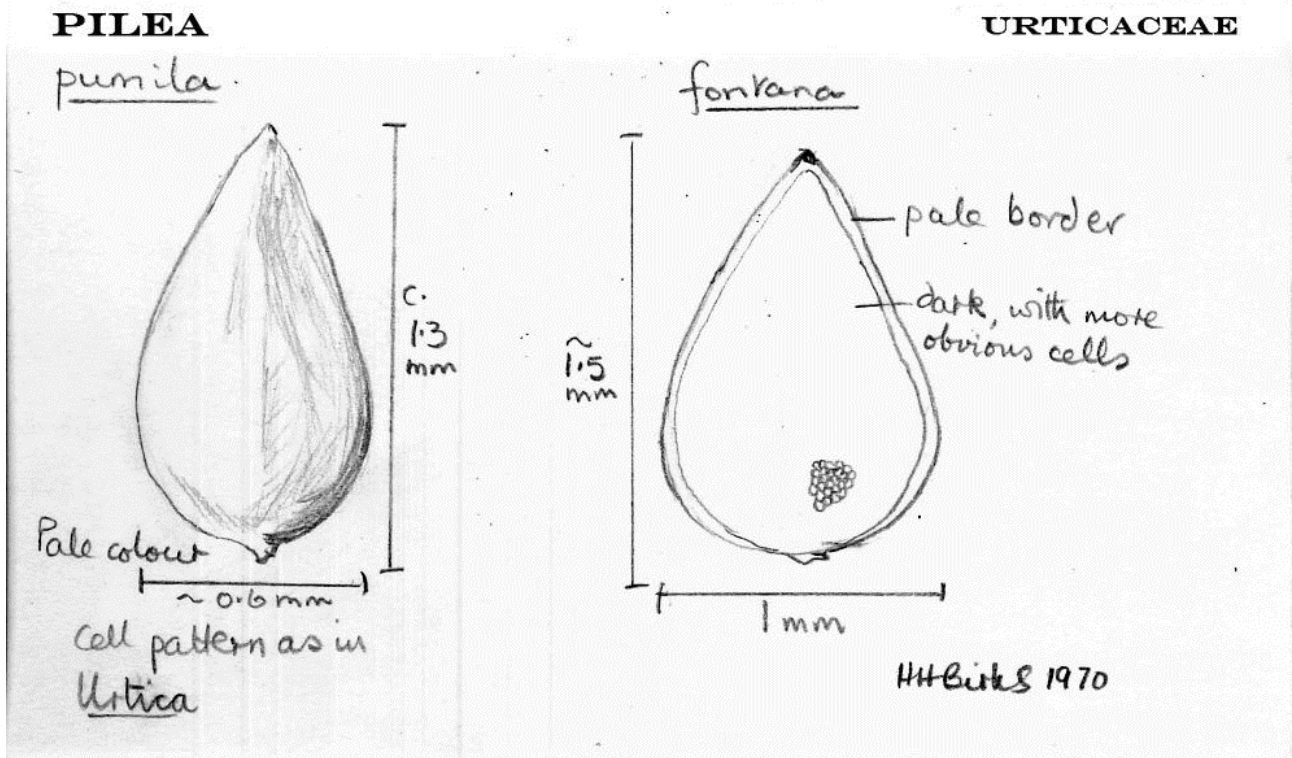
UMBELLIFERAE

Sium suave

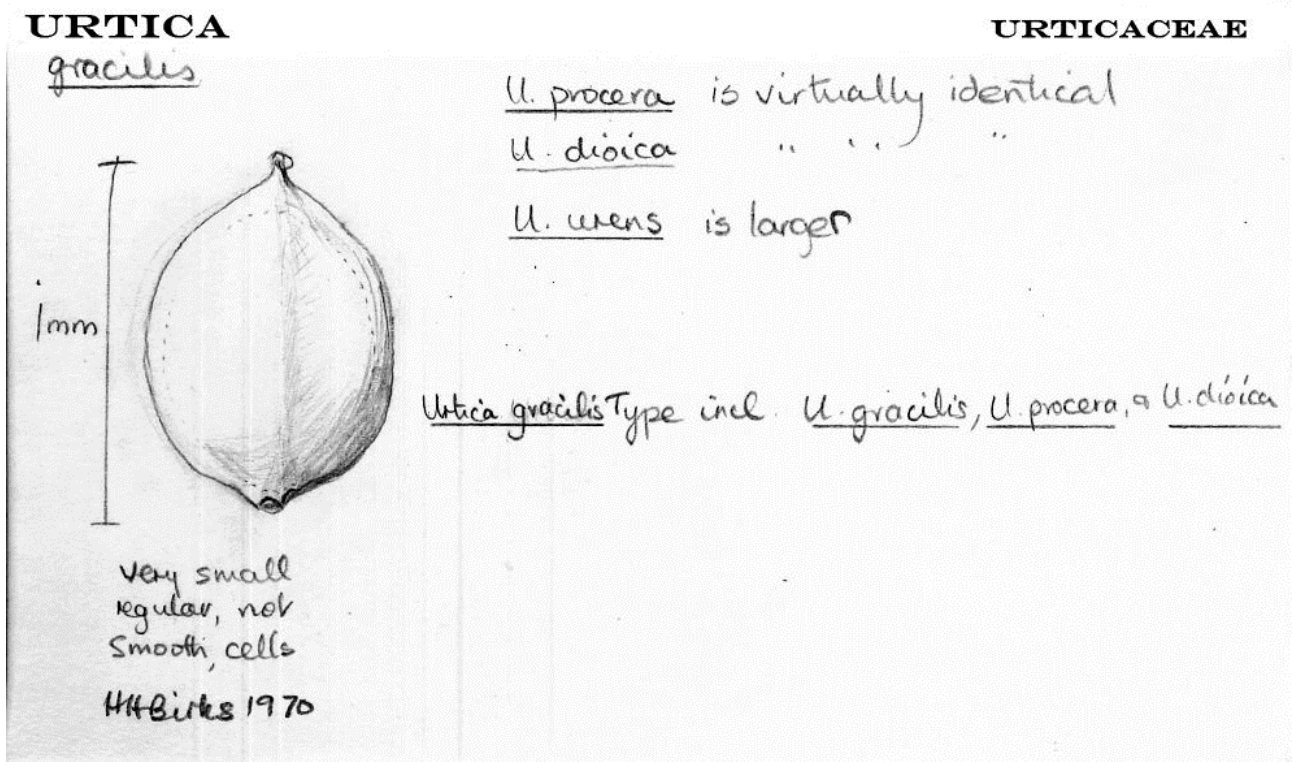


URTICACEAE

Pilea pumila

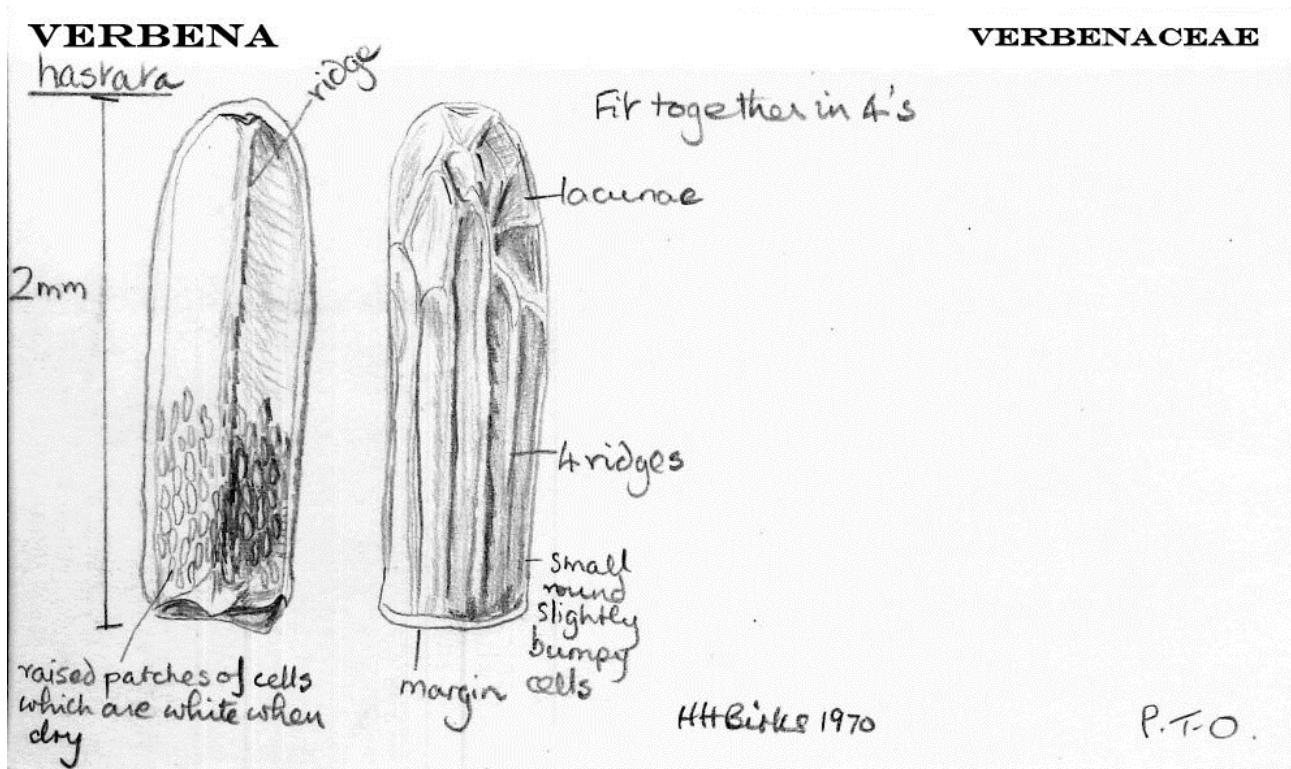


Urtica gracilis



VERBENACEAE

Verbena hastata



V. bracteata 2mm. better marked ridges & lacunae, white patches on proximal side smaller & more "spiky". No central ridge

V. officinalis Similar. very hooded apex

V. simplex Rather smooth, small patches of white cells. Lacunae well marked, starting 1/2 way down

V. urticifolia Fewer small white areas. Back ridges & lacunae not well marked.

VIOLACEAE

Viola pallens

