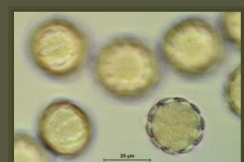
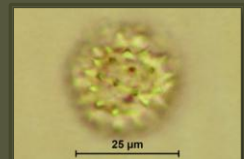
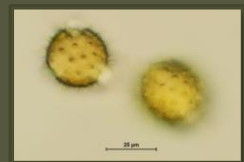
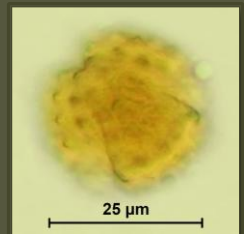
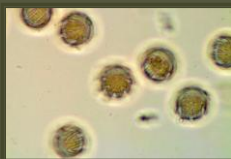
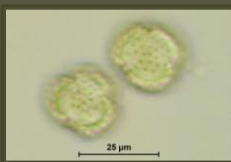
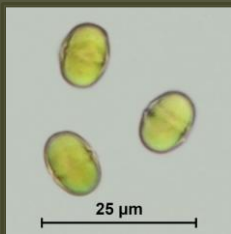


Collection of  
***Pyrrolizidine Alkaloid***  
***Plants & Pollen***  
*relevant for Honey Production*

A. Dübecke<sup>1</sup>, T. Beuerle<sup>2</sup>, S. Ronczka<sup>3</sup>, K. Speer<sup>3</sup>, P. Wessel<sup>1</sup>, G. Beckh<sup>1</sup>, C. Lüllmann<sup>1</sup>



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<sup>3</sup>Technical University of Dresden, Bergstrasse 66, D-01062 Dresden, Germany

# *Ageratum conyzoides* L.

## Plant Description

Native to tropical America, especially Brazil, invasive in Africa, Australia, Southeast Asia, USA

### COMMON NAMES

Billygoat-weed, Chick weed, Goatweed, Whiteweed

### HABIT

Annual herb, 50-100 cm high, erect, branched, slender, hairy and aromatic. Stems and leaves are covered with fine white hairs, leaves are stalked, ovate, from 2-6 to 4-10 cm long and 1-5 cm wide, with tip and base somewhat pointed and with round-toothed margins long. Flowers are purple to white, less than 6 mm across and arranged in close terminal inflorescences, flowering from July to September, pollination by insects. Black fruit. Peculiar odour to that of a male goat.

### HABITAT

Grows commonly in waste and on ruined sites.

### DISPERSAL

On the hairs of livestock and wild animals, clothes and agricultural machinery. It can complete its lifecycle (germination to flowering) in less than two months.

## Plant Pictures

Pictures of flowers, leaves and stems of *A. conyzoides* L. in Ghana.



Source: QSI

# *Ageratum conyzoides* L.

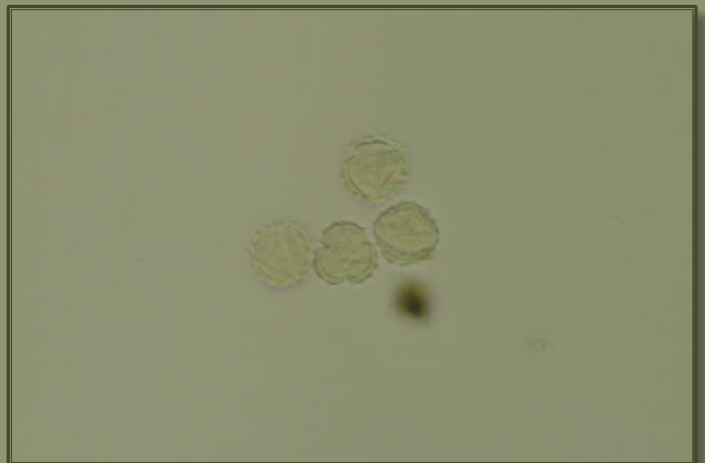
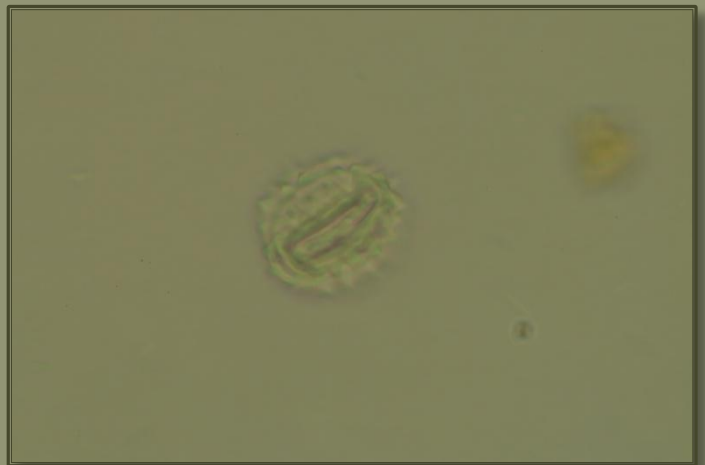
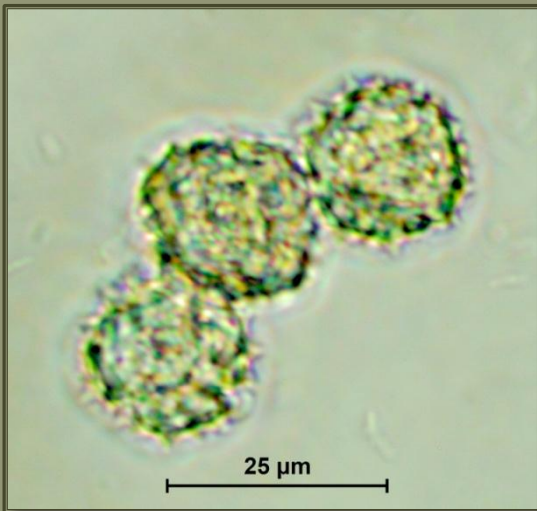
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: 20  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*A. conyzoides* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Anchusa officinalis* L.

## Plant Description

Native to East and Middle Europe, introduced in Britain and North America

### COMMON NAMES

Alkanet, Common Bugloss

### HABIT

Biennial or perennial herb, up to 30-100 cm high. Deep black taproot up to 1,2 m depth. Stems covered with hairs. Leaves lanceolate to linear 5 to 10 cm (ground leaves up to 20 cm) long and 1 to 2 cm (ground leaves up to 3,5 cm) wide. Florescences in pyramidal panicle-like clusters, each with five slitted blue-violet petals (5-7 mm long), corolla 1 to 1,5 cm long and 5 to 9 cm wide, its reddish color changes to dark blue-violet. Flowers from June to Oktober, seed ripening from Juli to Oktober. Pollination by bees

### HABITAT

Dry roadsides, pastures and waste ground, not frost tender

### DISPERSAL

Seed dispersal by ants (elaiosome)

## Plant Pictures

Pictures of flowers, leaves and stem of *A. officinalis* L. in Germany.



Source: Stefan Ronczka

# *Anchusa officinalis* L.

## Pollen Description

SHAPE:

oval

SIZE:

ca. 32 x 41  $\mu\text{m}$

APERTURE TYPE:

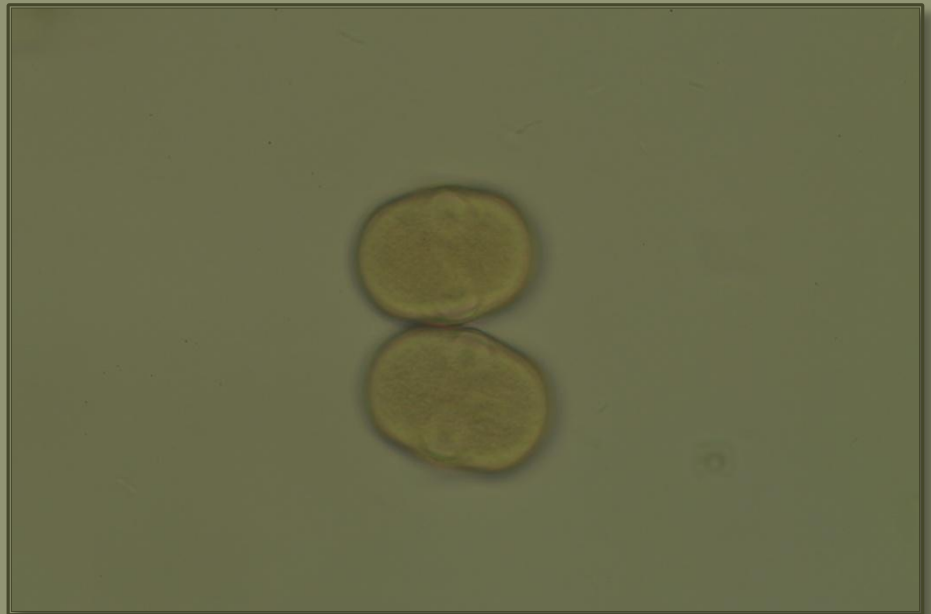
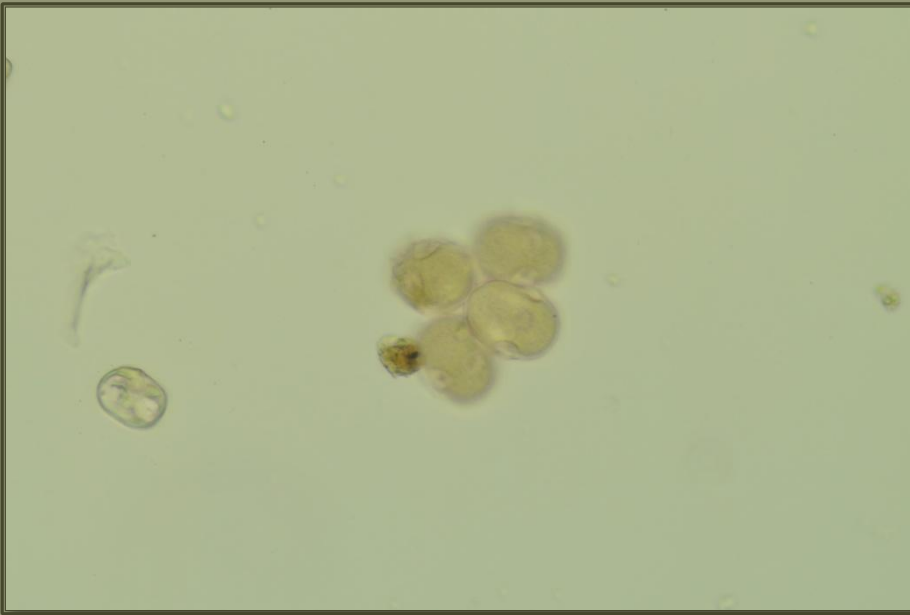
stephanocolporate

EXINE TYPE:

psilate

## Pollen Pictures

*A. officinalis* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Borago officinalis* L.

## Plant Description

Native to the Mediterranean region, Asia Minor, Europe, North Africa and South America

### COMMON NAMES

Borage, Starflower, Cucumberweed

### HABIT

Annual herb, up to 60-100 cm high. Bristly or hairy all over the stems and leaves. Leaves deep green, lanceolate to ovate, alternate and 5-15 cm long. Flowers five narrow, triangular-pointed petals, mostly blue (young flowers pink, cultivated flowers also white); flowering from May to September.

### HABITAT

Fallow lands, cultivated lands

### DISPERSAL

Seed dispersal by ants is typically accomplished when foraging workers carry diaspores back to the ant colony after which the elaiosome is removed or fed directly to ant larvae. (Myrmecochory)

## Plant Pictures

Pictures of flowers and stems of *B. officinalis* L. in Germany



Source: Stefan Ronczka

# *Borago officinalis* L.

## Pollen Description

SHAPE:

circular

SIZE:

ca. 27 x 30  $\mu\text{m}$

APERTURE TYPE:

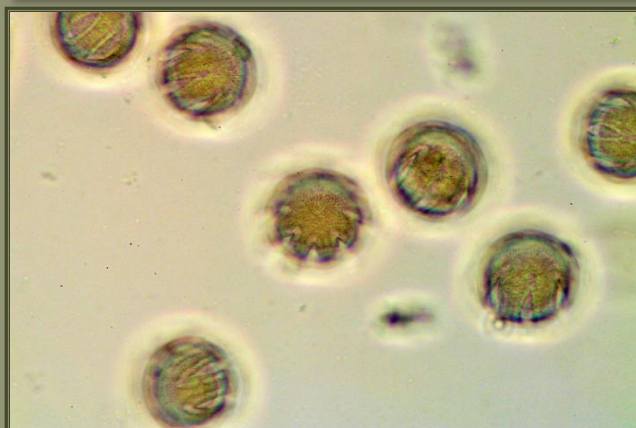
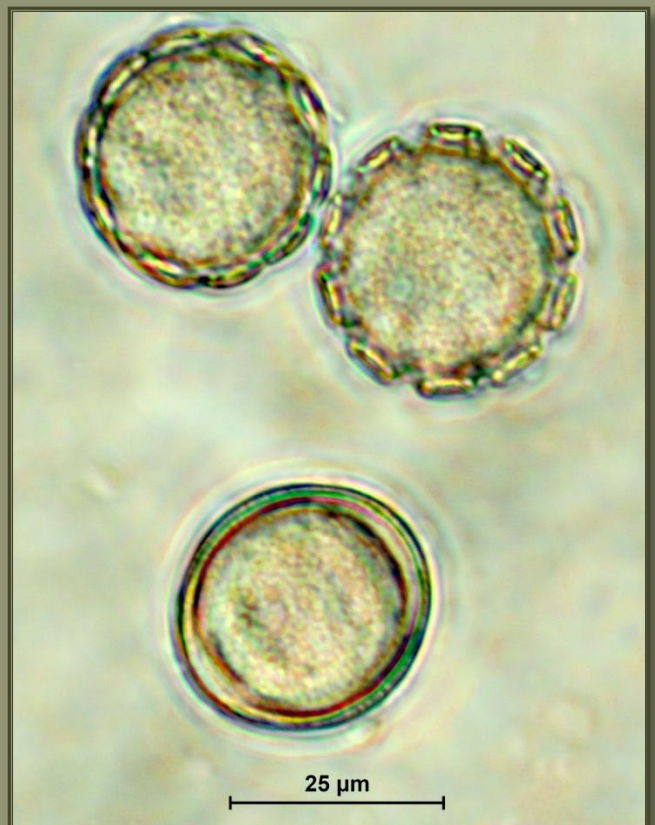
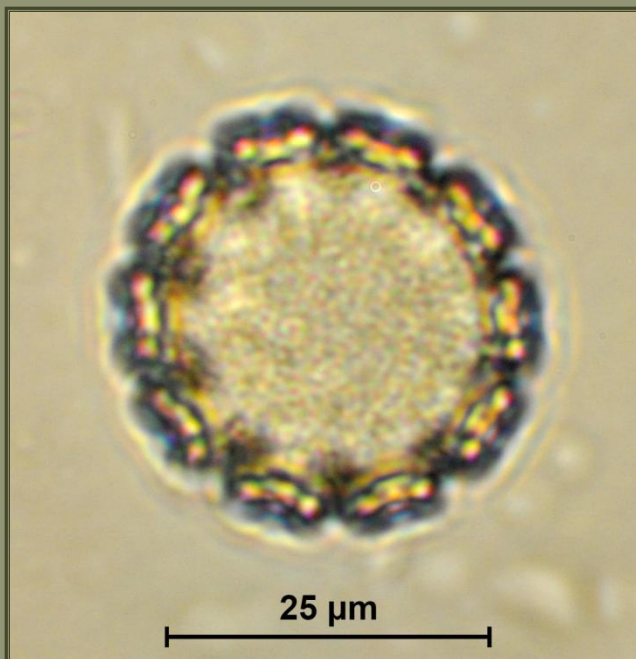
colporate

EXINE TYPE:

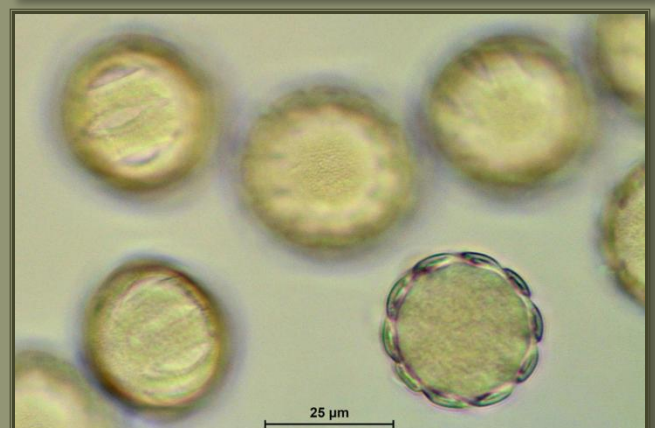
scabrate

## Pollen Pictures

*B. officinalis* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI



# *Chromolaena odorata* (L.) King & Robinson

## Plant Description

Native to tropical South America, north to Mexico and to the Caribbean Islands, introduced to tropical Asia, west Africa and parts of Australia

### COMMON NAMES

Jack in the bush, Christmas bush, Common Floss Flower, Siam Weed; formerly known as *Eupatorium odoratum* L.

### HABIT

Perennial bush to 7 m tall when growing in the open or to 20 m as a climber. Leaves triangular, 5–12 cm long, with forward facing serrations (three veins) on the margins. Stem with soft pith. Flowers: Terminal flat-topped clusters of white to pale lilac heads of flowers. Shallow, Seeds brown to black, 4–5 mm long, with white parachute-like white hairs (pappus) at the top of the seed, 4–5 mm long. The invasive populations of *C. odorata* in Asia and southern Africa (both originating from the Caribbean) are morphologically different.

### HABITAT

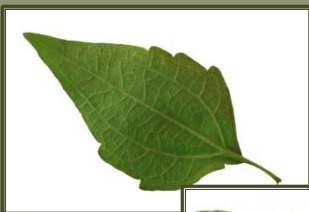
Forms pure stands in disturbed areas, grasslands, fallows and forestry plantations. *Chromolaena odorata* has been reported to be the most problematic invasive species within protected rainforests in Africa.

### DISPERSAL

Wind-dispersed (short and long distance), animal dispersal is possible by small hooks, also by root or stem fragments

## Plant Pictures

Pictures of flowers, roots and leaves of *C. odorata* (L.) King & Robinson in Ghana.



Source: QSI



# *Chromolaena odorata* (L.) King & Robinson

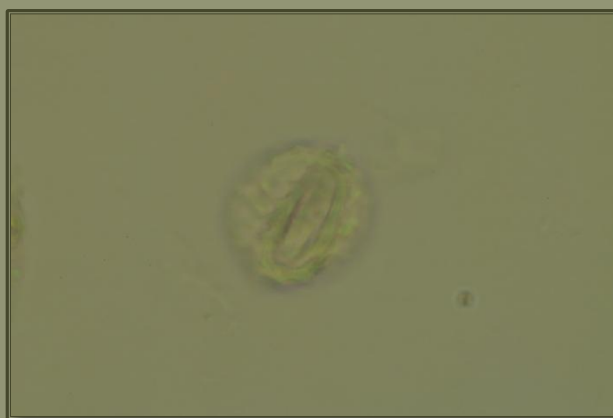
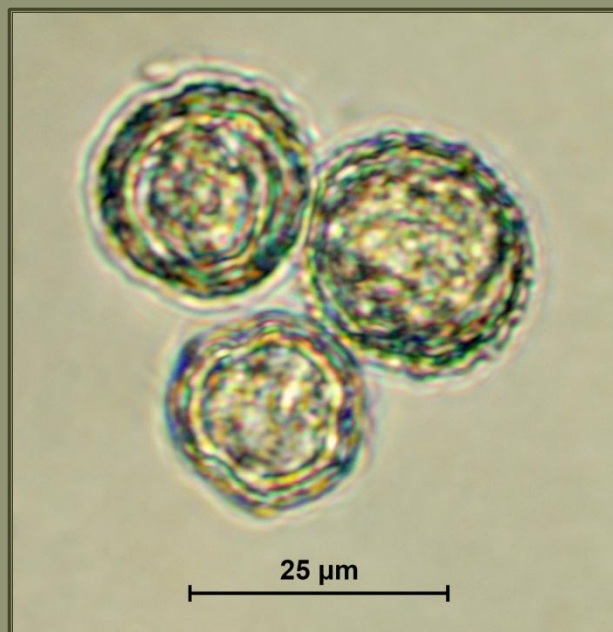
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: 21  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*C. odorata* (L.) King & Robinson pollen grains. Pictures prepared using light microscopy.



# *Cynoglossum creticum* Mill.

## Plant Description

Native to the Mediterranean region

### COMMON NAMES

Blue Hound's Tongue

### HABIT

Biennial herb, 20-80 cm high. In the first year only lanceolate rosettes with densely, soft, hairy leaves, in the second year the florescence rise, stem leaves half stem-clasping. Leaves up to 20 cm long and 3,5 cm wide. Long taproot.

Flowers (diameter 9 mm) short petiolate in cincinnus without pherophylls, firstly pink later pale blue with striking dark nerves, corolla 7-9 mm long (five sepals), five petals and five stamens at the base of the flower, flowering from April to June.

### HABITAT

Fallow lands, waysides, pine woods, open grasslands

### DISPERSAL

Four nutlets per flower with densely barbed spines, which are spread e.g. by animals

## Plant Pictures

Pictures of plant, flowers, leaves, stems and nutlets of *C. creticum* Mill. in Uruguay.



Source: QSI

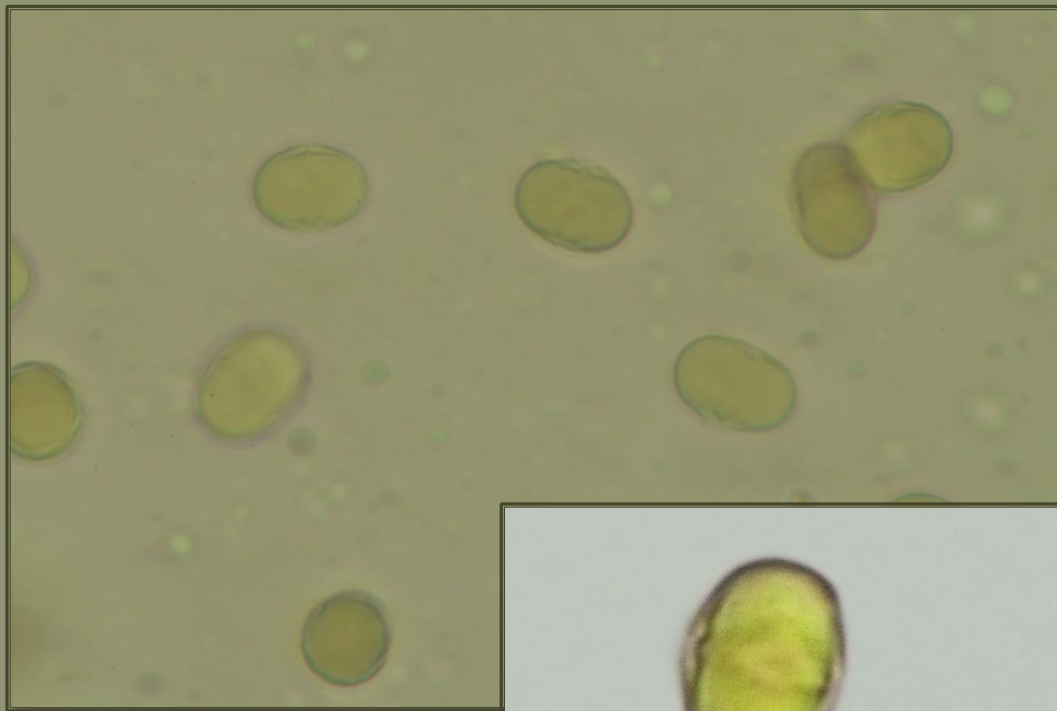
# *Cynoglossum creticum* Mill.

## Pollen Description

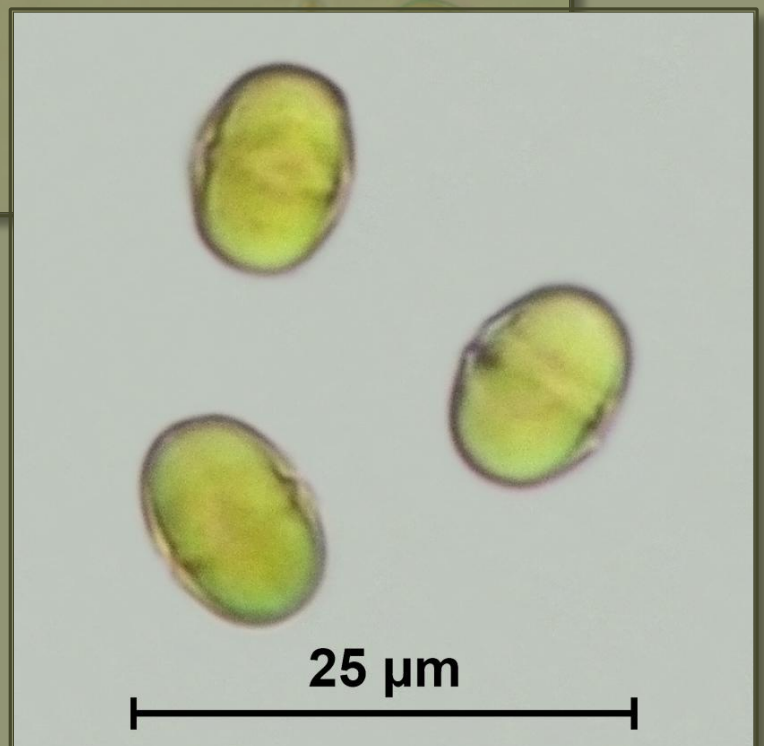
SHAPE:	oval	SIZE:	ca. 8 x 11 $\mu\text{m}$
APERTURE TYPE:	stephanocolporate	EXINE TYPE:	psilate

## Pollen Pictures

*C. creticum* Mill. pollen grains. Pictures prepared using light microscopy.



Source: QSI



# *Cynoglossum officinale* L.

## Plant Description

Native to Europe, invasive in North America

### COMMON NAMES

Houndstongue, Houndstooth, Dog's tongue, Gypsy flower, rats and mice (due to its smell)

### HABIT

Annual or biennial herb, up to 80 cm high. Strong, erect, edged stems up to 1 cm in diameter, villously haired, and densely leaved. Basal rosette leaves and stem-clasping stem leaves covered with fine white hairs. Funnel-shaped reddish-purple flowers in scorpioid cymes, flowers from May to July.

### HABITAT

Cultivated lands, roadsides, ruderals in sunny places

### DISPERSAL

By animals e.g. rabbit (nutlets barbed)

## Plant Pictures

Pictures of plants, flowers and leaves of *C. officinale* L. in Germany



Source: Dr. Till Beuerle

# *Cynoglossum officinale* L.

## Pollen Description

SHAPE:

oval

SIZE:

~ 14  $\mu\text{m}$

APERTURE TYPE:

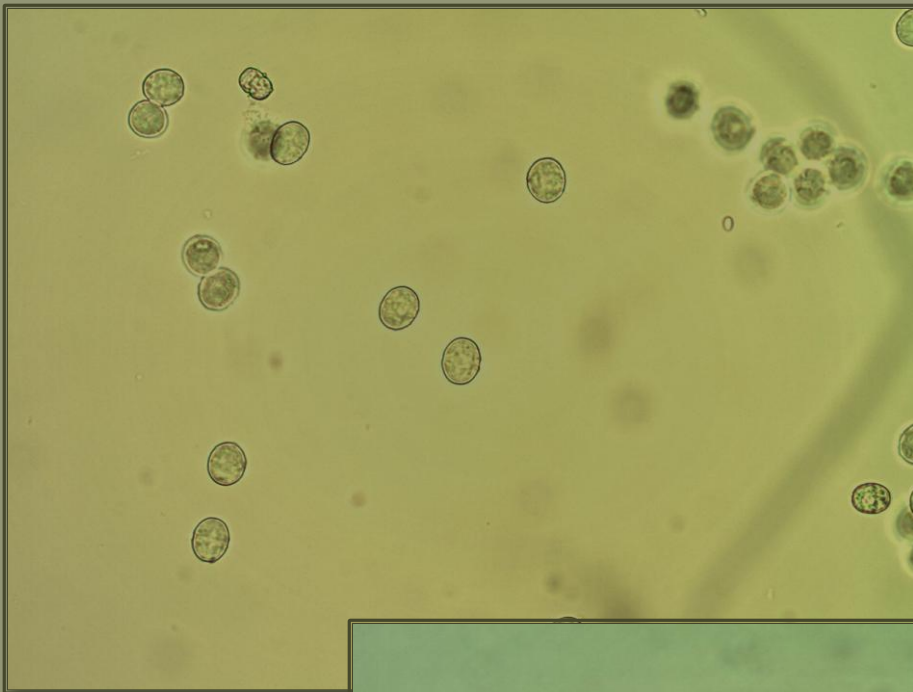
stephanocolporate

EXINE TYPE:

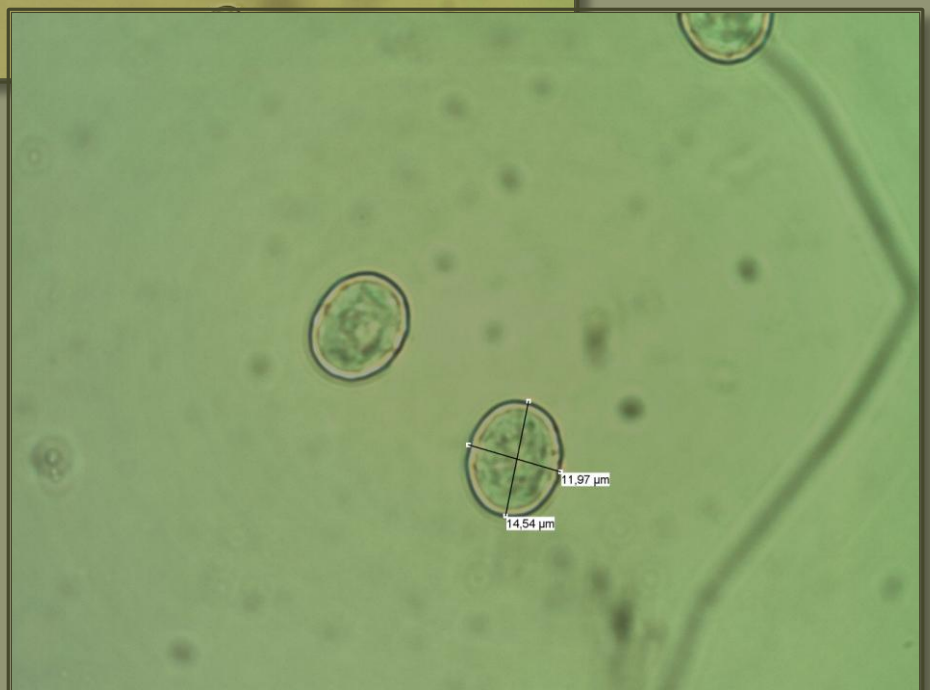
psilate

## Pollen Pictures

*C. officinale* L. pollen grains. Pictures prepared using light microscopy.



Source: Dr. Till Beuerle



# *Echium plantagineum* L.

## Plant Description

Native to western and southern Europe, northern Africa and southwest Asia (invasive weed in Australia, South Africa and USA)

### COMMON NAMES

Purple Viper's Burgloss, Blueweed, Lady Campbell, Riverinn Bluebell; Paterson's Curse and Salvation Jane in South Australia

### HABIT

Annual, biennial or perennial herb, 20-60 cm in Australia up to 120 cm high. Fleshy taproot with smaller laterals. Leaves rough, hairy lanceolate/oval up to 14 cm in Australia 30 cm long in rosettes. Stem leaves: heart-shaped base, half stem-clasping. Flowers purple (younger pink), 15-20 mm long, tubular, borne on a branched spike in clusters, 2-5 stamens protruding; flowering from April to July.

### HABITAT

Waysides, dry fallow lands, sandy soils inshore. Invades to grasslands, heathlands and woodlands of Australia

### DISPERSAL

Wool and fur, alimentary tracts of grazing animals and birds, water, contaminant of hay and grain

## Plant Pictures

Pictures of flowers, leaves and stems of *E. plantagineum* L. in Uruguay. Details show the younger pink and the older purple stadium and the protruding stamens.



Source: QSI

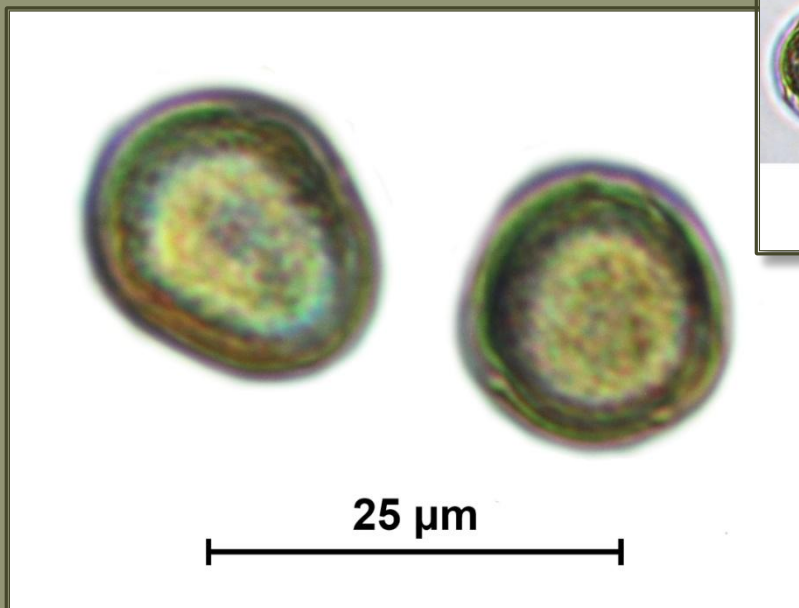
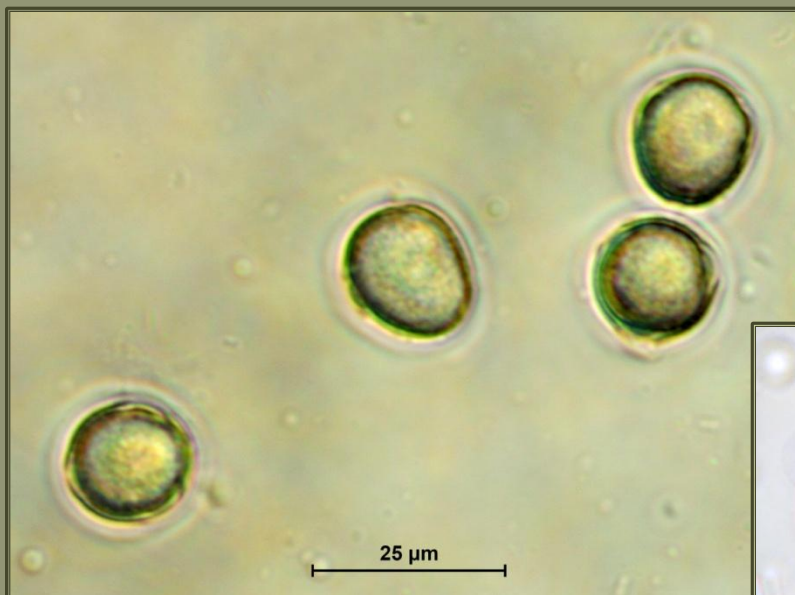
# *Echium plantagineum* L.

## Pollen Description

SHAPE:	heteropolar	SIZE:	ca. 16 x 18 $\mu\text{m}$
APERTURE TYPE:	colporate	EXINE TYPE:	psilate

## Pollen Pictures

*E. plantagineum* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Echium vulgare* L.

## Plant Description

Native to the Mediterranean region and western Europe

### COMMON NAMES

Blue Borage, Viper's Bugloss

### HABIT

Annual or biennial herb, up to 30-120 cm high. Deep taproot. Stems stiff erect, covered with reddish bristly hairs, many short branches. Leaves covered with coarse, white hairs. Basal rosette leaves 15 x 5 cm, narrow, stiff-bristly, harsh to touch, sessile. Stem leaves much smaller, alternate, also rough. Funnel-shaped, blue or purple flowers, in one-sided racemes up to 300 mm long. Petals 12-18 mm long. Flowers from July to August. NB floescence spike-like (as opposed to laxly branching in *E. plantagineum*). Basal leaves narrow. Sessile, without prominent lateral veins.

### HABITAT

Cultivated lands, pastures, roadsides, bare land, riverbeds, usually in dry, low fertility inland areas

### DISPERSAL

Contaminated wool and fur, hay, equipment and seed, including wild bird feed and wildflower seed mixes, runoff water

## Plant Pictures

Pictures of flowers, leaves and stems of *E. vulgare* L. in Chile and Uruguay. This plant is very abundant and much visited by honey bees. Beekeepers place their hives purposely in *Echium* fields.



Source: QSI



# *Echium vulgare* L.

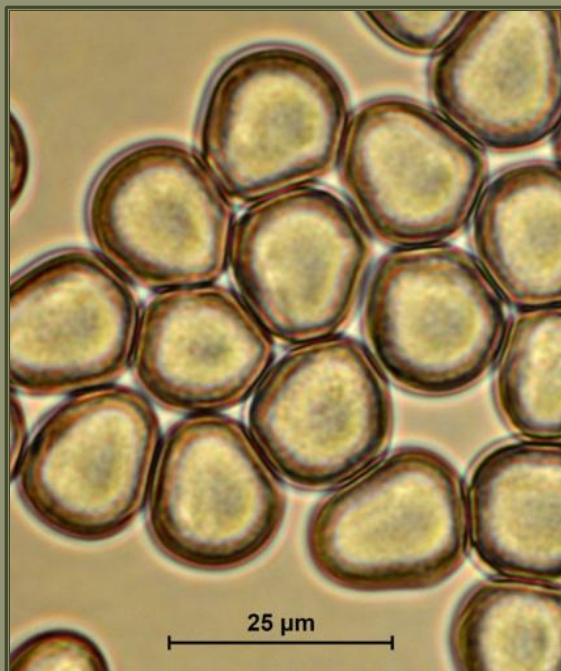
## Pollen Description

SHAPE: heteropolar  
APERTURE TYPE: colporate

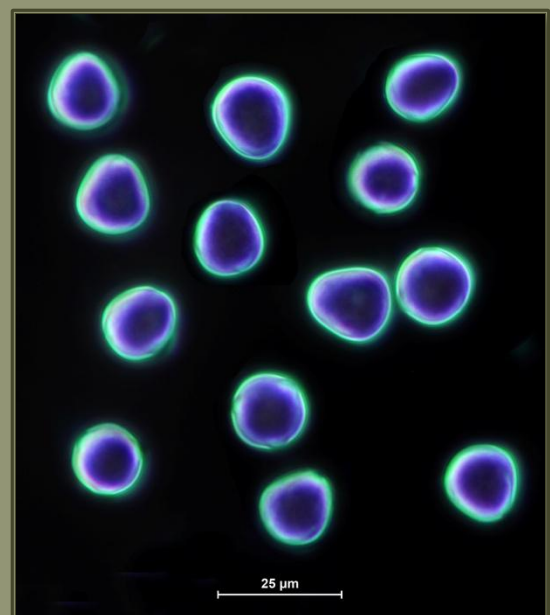
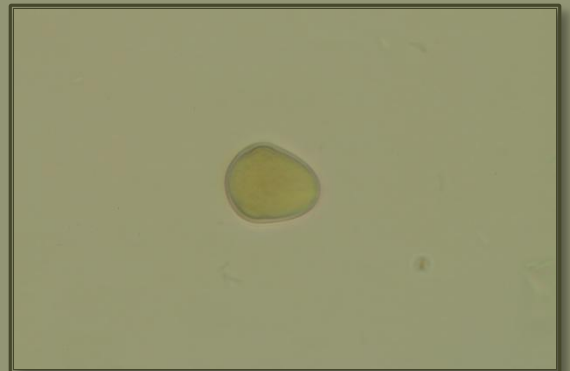
SIZE: ca. 14 x 17  $\mu\text{m}$   
EXINE TYPE: psilate

## Pollen Pictures

*E. vulgare* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI



# *Eupatorium buniifolium* Hook & Arn.

## Plant Description

Native to Bolivia, Brasil, Uruguay and Argentina

### COMMON NAMES

Chilca negra

### HABIT

Perennial herb, 50 - 100 cm high. Florescence mauve coloured, hanging in rows flowers and fruits in April in the above mentioned countries. Rich leaved stems; *E. buniifolium* differs from other *Eupatorium* species by polymorph leaves, sometimes simple and linear, others with pinnate leaves with linear sections. Sometimes it is described as very interesting plant for honey production!

### HABITAT

Sandy, rocky soils, on streams embankments, hillsides and roadsides. The species occurs in shrubby vegetation, forest and grassland.

### DISPERSAL

By wind (pappus)

## Plant Pictures

Pictures of plants, flowers and leaves of *E. buniifolium* Hook & Arn. in Uruguay.



Source: QSI

# *Eupatorium buniifolium* Hook & Arn.

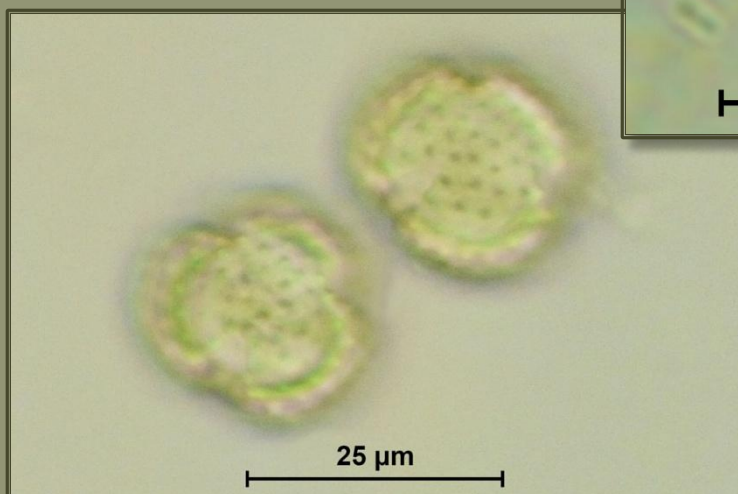
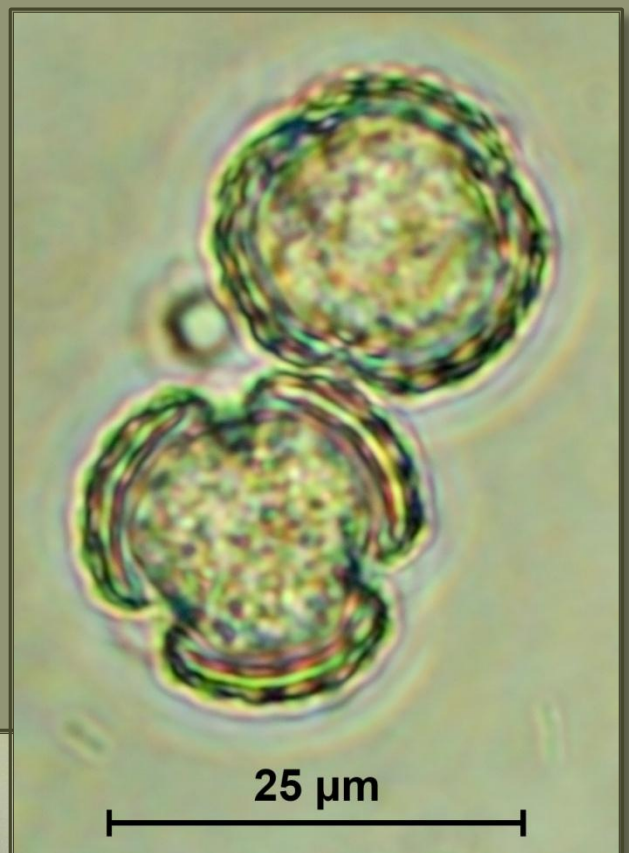
## Pollen Description

SHAPE: intersemiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 22  $\mu\text{m}$   
EXINE TYPE: foveolate

## Pollen Pictures

*E. buniifolium* Hook & Arn. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Eupatorium cannabinum* L.

## Plant Description

Native to many areas of Europe; invasive in Asia, North America and Australia

### COMMON NAMES

Hemp-agrimony

### HABIT

Perennial herb, 50 – 150 up to 1,75 cm high. Dioecious, racemes of mauve flowers (flowering July to September); flowers tiny, fluffy in dusty pink or whitish with protruding pistils, flowering from July to September; florescence in basket-shaped sections; simple rich leaved redish stems; opposite, palmate, pinnate (3-7) leaves, whiche are lobate, dentate.

### HABITAT

Moist low-lying areas in temperate Eurasia,

### DISPERSAL

By wind, Achene 2-3mm long, borne by a pappus with hairs 3-5mm long (Anemochory)

## Plant Pictures

Pictures of flowers of *E. cannabinum* L. in Germany.



Source: QSI

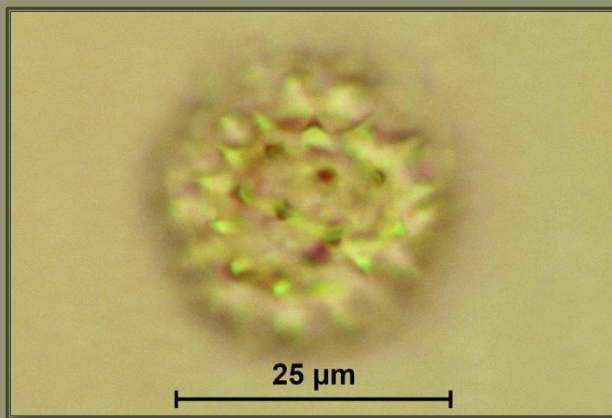
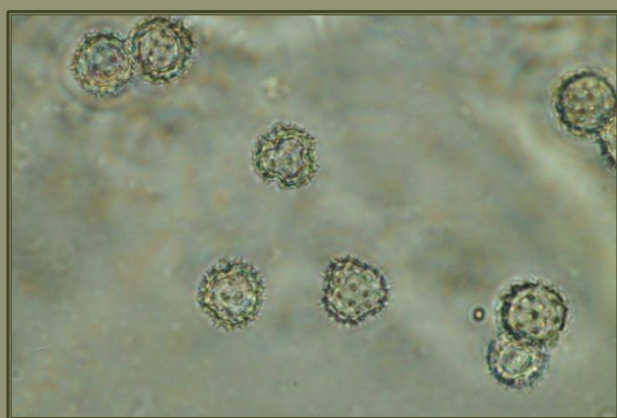
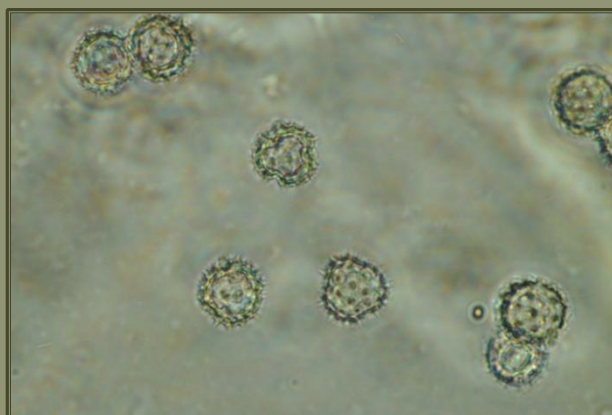
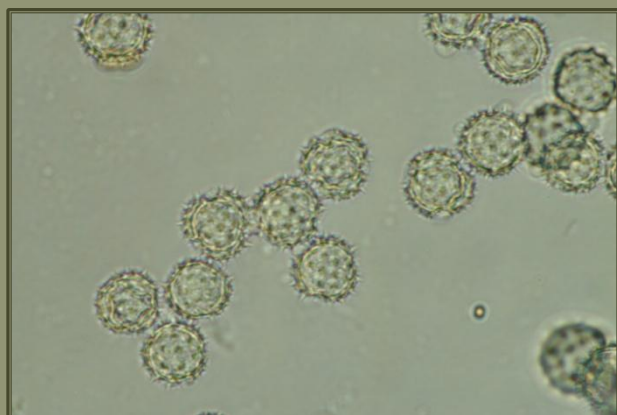
# *Eupatorium cannabinum* L.

## Pollen Description

SHAPE:	semiangular	SIZE:	ca. 19 $\mu\text{m}$
APERTURE TYPE:	colporate	EXINE TYPE:	echinate

## Pollen Pictures

*E. cannabinum* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Eupatorium macrocephalum* Less.

## Plant Description

Native to South America (Argentina and Brazil), Central America and Mexico.

### COMMON NAMES

Pompon weed, pompon bossie

### HABIT

Erect, perennial herb with fluffy pink flowerheads. Stems green to purplish, up to 1,3 m high, dying back annually to a root crown. Leaves are light green, scattered along the length of the stem but clustered at the base to form a rosette, up to 80 mm long and 20 mm wide, margins are serrated. Flowers light purple to pink compact flowerheads that are situated terminally, flowers December-March.

### HABITAT

Grasslands, roadsides

### DISPERSAL

By wind: Produces fluffy seeds that are wind dispersed. It can also regenerate from underground rhizomes.

## Plant Pictures

Pictures of flowers and leaves of *E. macrocephalum* Less. in Uruguay.



Source: QSI

# *Eupatorium macrocephalum* Less.

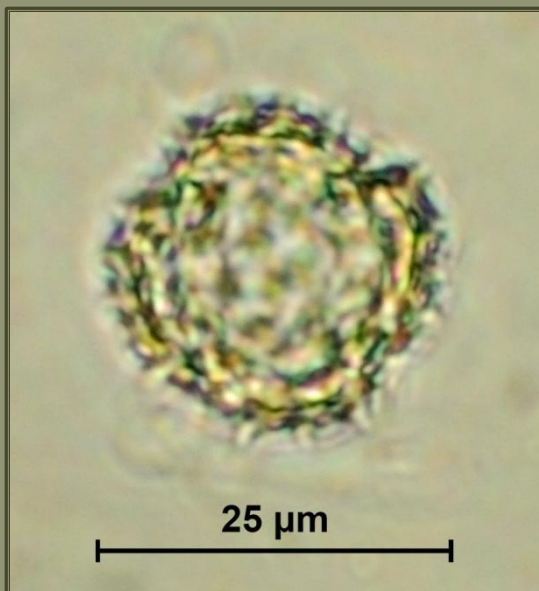
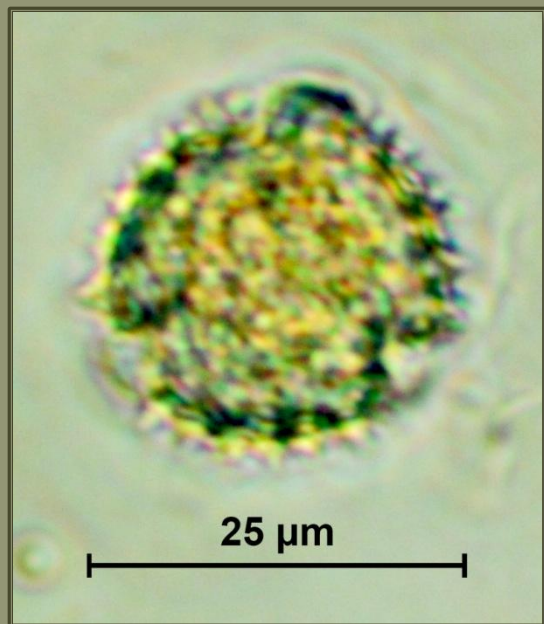
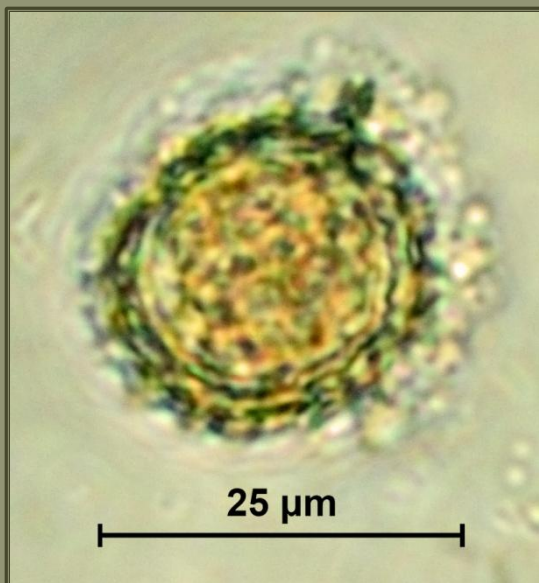
## Pollen Description

SHAPE: intersemiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 22  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*E. macrocephalum* Less. pollen grains. Pictures prepared using light microscopy.



# *Heliotropium amplexicaule* Vahl

## Plant Description

Native to South America esp. Argentina, invasive to Australia (New South Wales) and others

### COMMON NAMES

Clasping heliotrope, blue heliotrope, summer heliotrope

### HABIT

Perennial herb, 15 up to 60 cm high. Branching, hairy stems; abundant foliage of oblanged wavy-edged oblanceolate to lanceolate green hairy leaves, 4-9 cm long; curving terminal spikes florescences hold several tiny bright purple flowers with rounded lobes and tubular yellow throats, sepals to 3,5 mm, corolla 3-8 mm long, anthers acuminate, tips free. Flowers from late spring to early autumn (in Australia from November to March) Fruits: paired rough surfaced nutlets. Woody rootstock with strong, slender taproot.

### HABITAT

Roadsides, waterways, fegrases pastures, fallowlands

### DISPERSAL

Spread by seed in mind, produce, clothing and water, regrow from root buds

## Plant Pictures

Pictures of flowers, leaves and stems of *Heliotropium amplexicaule* Vahl in Uruguay.



Source: QSI



# *Heliotropium amplexicaule* Vahl

## Pollen Description

SHAPE:

oval

SIZE:

ca. 30 x 36  $\mu\text{m}$

APERTURE TYPE:

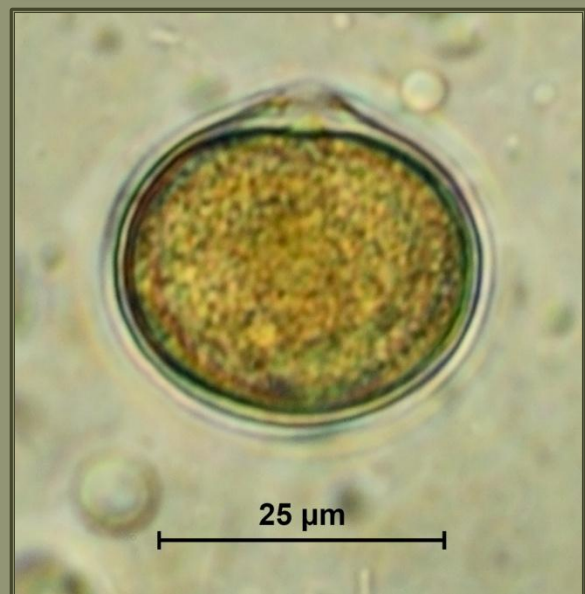
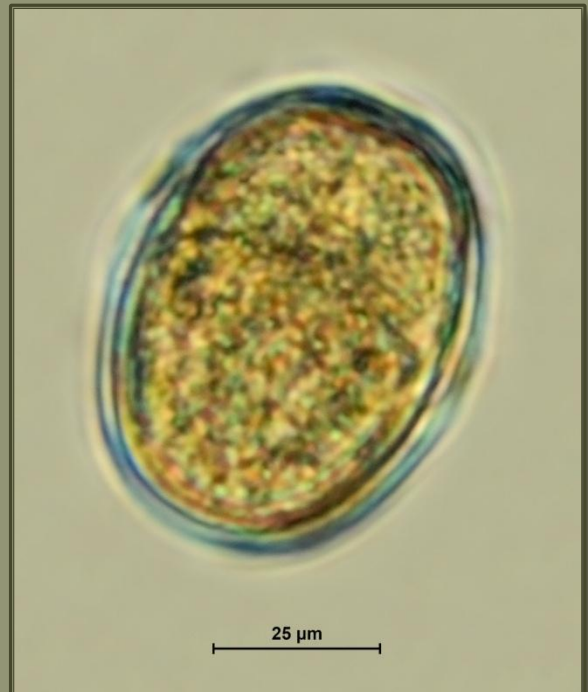
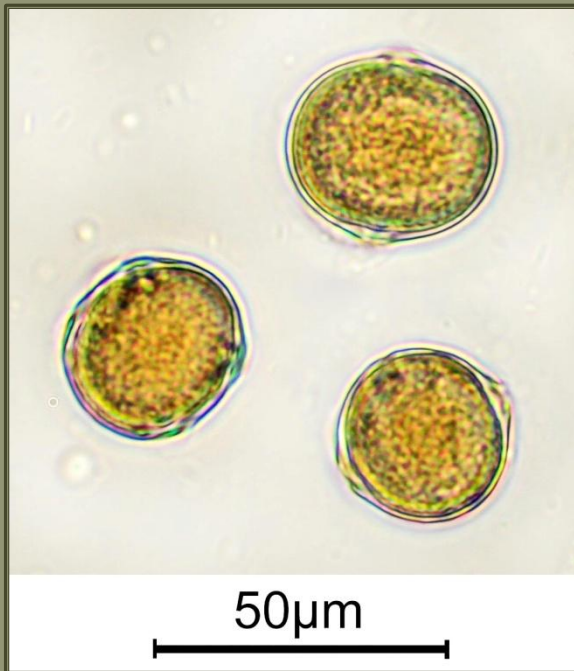
colporate

EXINE TYPE:

psilate

## Pollen Pictures

*H. amplexicaule* Vahl pollen grains. Pictures prepared using light microscopy.



# *Senecio bracteolatus* Hook & Arn.

## Plant Description

Native to Argentina and Chile

### COMMON NAMES

Maria-mole

### HABIT

Perennial herb, 30-60 cm sometimes up to 100 cm high, shallow taproot. Stems erect, leafy, rising from the woody base, numerous branched, leaves usually sessile, with the blade bright green, simple and slightly thickened, linear. The inflorescence is yellow, flowering June until November.

Varies from other *Senecio* species by leaf sizes 20-45 x 1-1,5 mm, the more closed flower with filamental petals similar to *S. filaginoides* and stem leaves up to the flower.

Associated with specific fauna, which uptake the pyrrolizidine alkaloids and are thereby inedable for predators.

### HABITAT

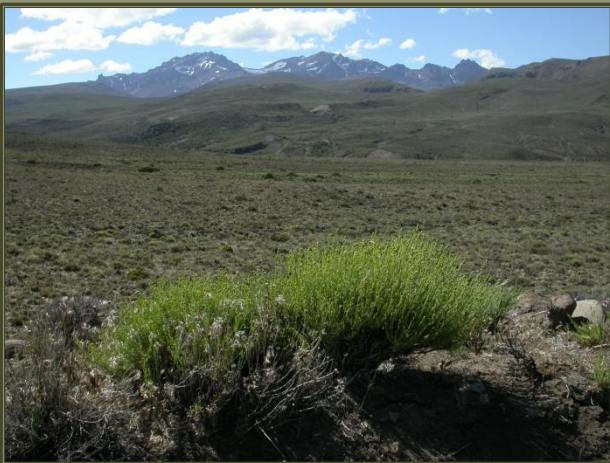
In steppe up to 1400 m, also in woodlands on sandy and dry soils

### DISPERSAL

By wind (pappus).

## Plant Pictures

Pictures of plant, flowers, leaves, stems and associated fauna of *S. bracteolatus* Hook & Arn. in Uruguay.



Source: QSI

# *Senecio bracteolatus* Hook & Arn.

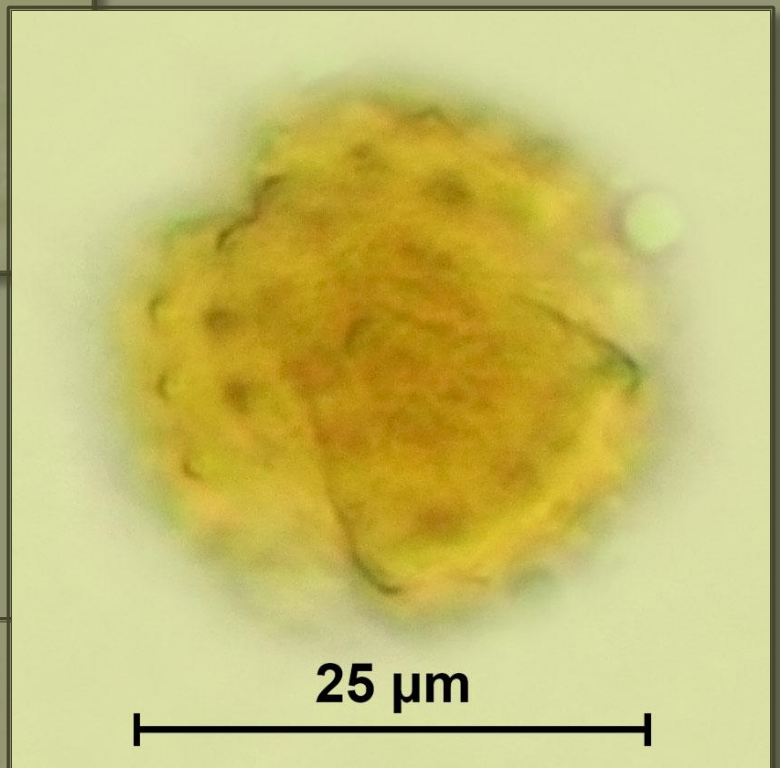
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 30  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*S. bracteolatus* Hook & Arn. pollen grains. Pictures prepared using light microscopy.



# *Senecio brasiliensis* (Spreng.) Less.

## Plant Description

Native to Argentina, Brasil, Paraguay and Uruguay

### COMMON NAMES

Maria-mole, flor das almas

### HABIT

Perennial herb, 1-1,5 m up to 2,5 m high, with erect stems, glabrous, grooved, much branches, densely leaved with alternate leaves. Leaves sessile, pinnate with serrate sections, glabrous only a little tomentous on the lower side. Flowers yellow, dimorph, with numerous flower heads in groups. The ray florets are female, with bright yellow ligules and surround the tubular florets, pistils curled; flowering from Oktober to Novemver/December. Dark tipped sepals. The fruits and leaves contain Pyrrolizidine Alkaloids.

### HABITAT

Roadsides, clearence areas, fallow lands etc. Forms dense groups also in moist places, riversides, etc.

### DISPERSAL

By wind (pappus)

## Plant Pictures

Pictures of plant, flowers, leaves, stems and fruiting of *S. brasiliensis* (Spreng.) Less. in Uruguay.



Source: QSI

# *Senecio brasiliensis* (Spreng.) Less.

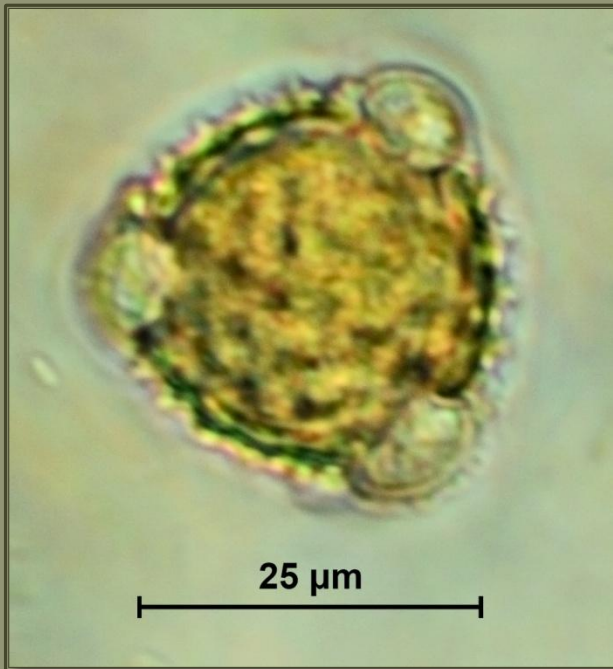
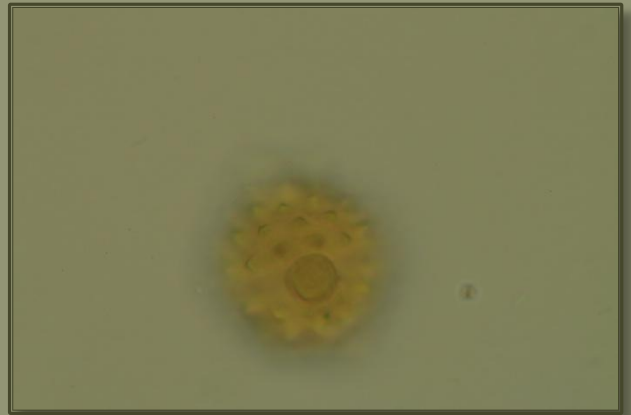
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 26  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*S. brasiliensis* (Spreng.) Less. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Senecio filaginoides* DC.

## Plant Description

Native to Argentina

### COMMON NAMES

Yoyo moro, romerillo mata mora, mata negra, charcao plateado

### HABIT

Perennial shrub, from 0,5 to 1 m, much branched and of ashy green color. Stems cylindrical and rich leaved up to the flower. Leaves linear, alternating, small and silky/pubescence. Flowers yellow, flower heads in clusters. Filaginoid petals. Flowering from December to February. Fruits appear between February and March.

This specimen, like other members of the species, produce a strong aroma product of essential oil. This aroma of *Senecio filaginoides* is characteristic for its recognition in the field.

Associated with specific fauna, which uptake the pyrrolizidine alkaloids and are thereby inedable for predators.

### HABITAT

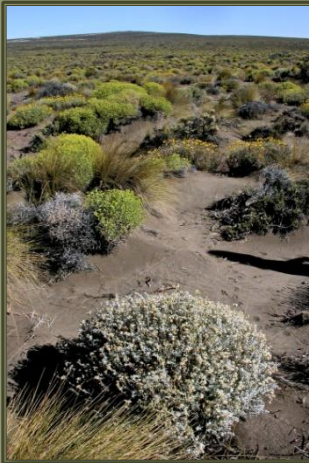
On sandy or rocky soils, side-strips, crees

### DISPERSAL

By wind (pappus)

## Plant Pictures

Pictures of plant, flowers, leaves associated fauna and fruiting of *S. filaginoides* DC. in Uruguay.



# *Senecio filaginoides* DC.

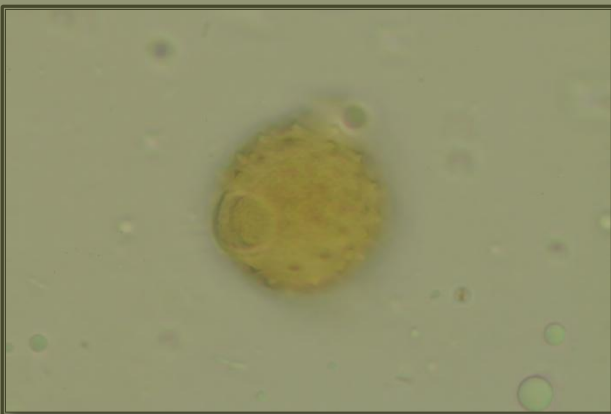
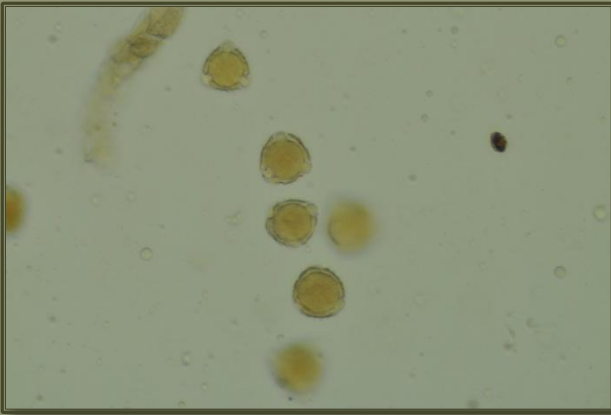
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 31  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*S. filaginoides* DC. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Senecio inaequidens* DC.

## Plant Description

Native to South Africa

### COMMON NAMES

South African ragwort, narrow-leaved ragwort, (small-leaved) groundsel, guano bush

### HABIT

Perennial herb, 30-60 cm sometimes up to 100 cm high, shallow taproot. Stems erect, leafy, rising from the woody base, numerous branched and glabrous, sometimes sparsely hairy; leaves ('*inaequidens*' means 'irregular teeth') alternate, usually sessile, occasionally petiolate, with the blade bright green, simple and slightly thickened, usually with the base clasping the stems, basal leaves sessile, 3 to 14 cm long and 0,3 to 1 cm wide and linear to elliptic-lanceolate blades with acute apices. The upper leaves are shortly petiolate, subsessile or sessile and occasionally pinnately-lobed. The inflorescence is an open, terminal or axillary, corymbose panicle ranging from 80 to 100 per plant. Radiate capitula 18 to 25 mm in diameter; with about 20 involucre bracts are characteristic of the species. The bracts are narrowly ovate with acute apices, more or less glabrous, keeled, 5 mm long and resinous. The calyculus bracts, 8 to 12, have acute apices, are more or less glabrous and dark tipped. The ray florets, 7 to 13, are female, with bright yellow ligules. Flowering June until November.

### HABITAT

Along roadsides, railroads in large quantities, ruderal growing etc.

### DISPERSAL

By wind (pappus)

## Plant Pictures

Pictures of flowers of *S. inaequidens* DC. in Germany.



Source: QSI



# *Senecio inaequidens* DC.

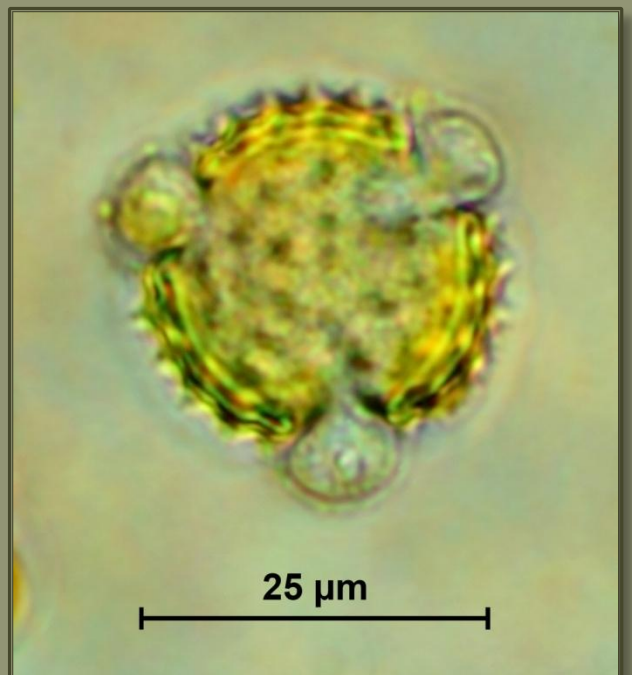
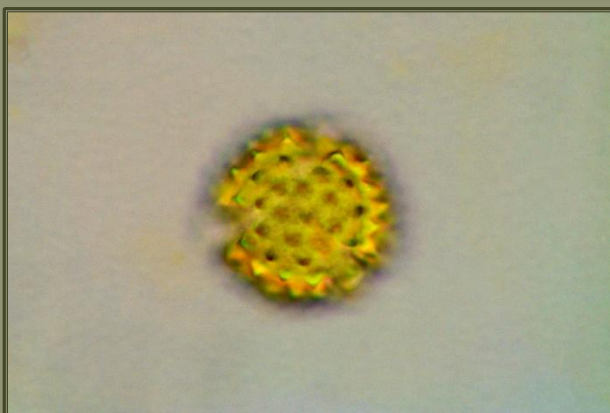
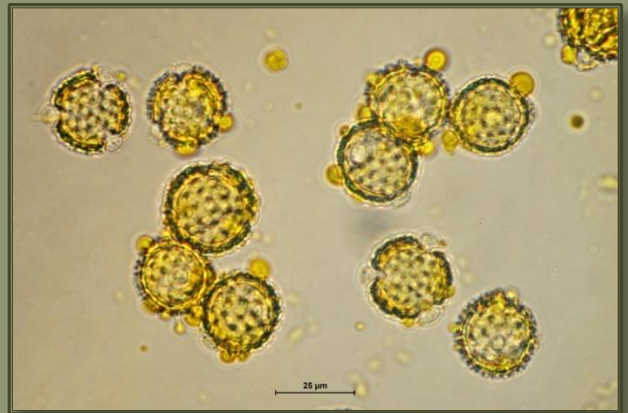
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 25  $\mu$ m  
EXINE TYPE: echinate

## Pollen Pictures

*Senecio inaequidens* DC. pollen grains. Pictures prepared using light microscopy.



# *Senecio jacobaea* L.

## Plant Description

Native to Eurasia

### COMMON NAMES

Tansy Ragwort, Cushag, Stinking Nanny and others according to unpleasent smell

### HABIT

Mostly biennial sometimes perennial herb, 30 to 100 cm high. First year ground level rosette (diameter 20 cm), second year stem (often reddish) with yellow flowers. Lyrate, pinnate leaves with more or less edgeless toothed broadened sections, base with auricles, withish cobweb-like hairs. Flat-topped flower head clusters, composed of yellow flowers, which appear late summer until fall.

Corymbs with many flower heads with 15-25 mm diameter (often 12-15 ligulate florets per flower head, also tubular florets and 13 husks)

### HABITAT

Roadsides, fields, overgrazed or poorly managed pastures

### DISPERSAL

By wind (pappus).

## Plant Pictures

Pictures of plant, flowers, leaves and roots of *Senecio jacobaea* L. in Germany.



Source: QSI

# *Senecio jacobaea* L.

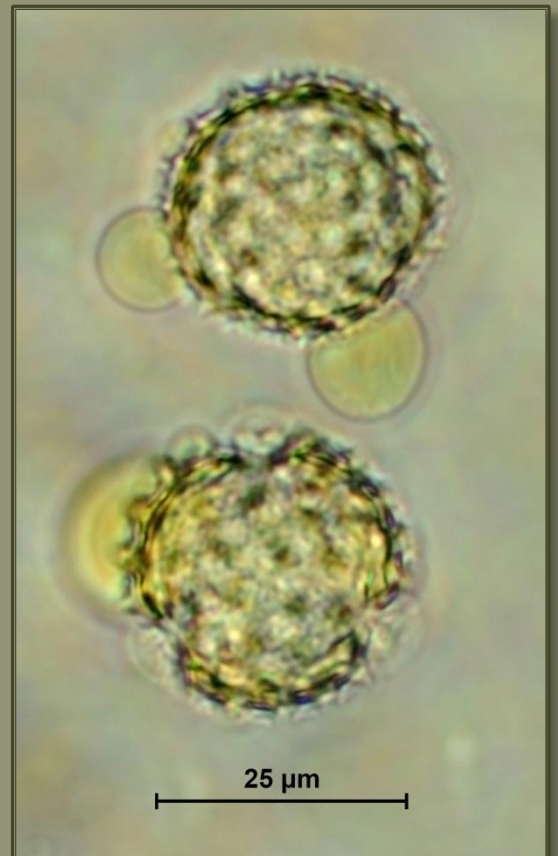
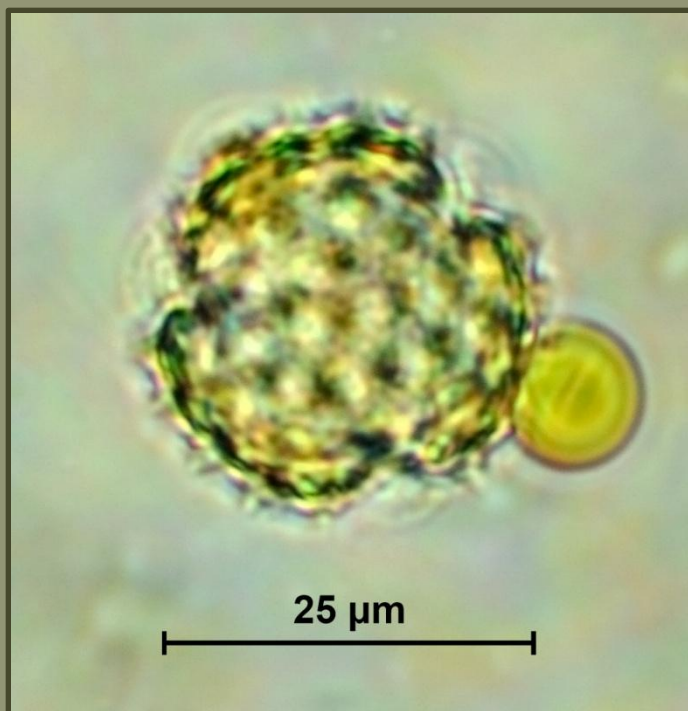
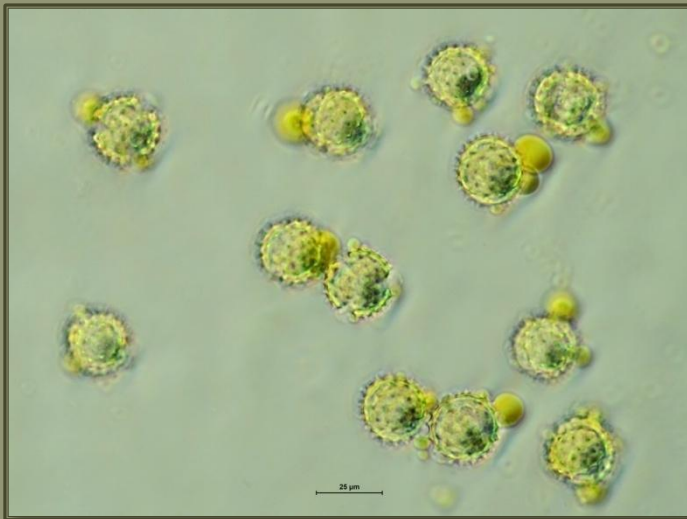
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 25  $\mu$ m  
EXINE TYPE: echinate

## Pollen Pictures

*S. jacobaea* L. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Senecio selloi* (Spreng.) DC

## Plant Description

Native to Brasil, Uruguay and Argentina

### COMMON NAMES

-

### HABIT

Annual herb, 40-80 cm high. Leaves oblanceolate to spatulate and auriculate, glandular and irregular toothed, of 4-10 cm length. Flower heads 4-5 cm diameter in loose clusters Calyculus bell-shaped, 15 mm high, linear-shaped hairy glandular bracts . Yellow flowers with ligules (15 mm high), flowering in spring. Hairy nutlets of 2 mm length.

### HABITAT

Fields, roadsides

### DISPERSAL

By wind (pappus)

## Plant Pictures

Pictures of flowers, leaves and stems of *S. selloi* L.



Andrés González

Source: Andrés González

# *Senecio selloi* (Spreng.) DC

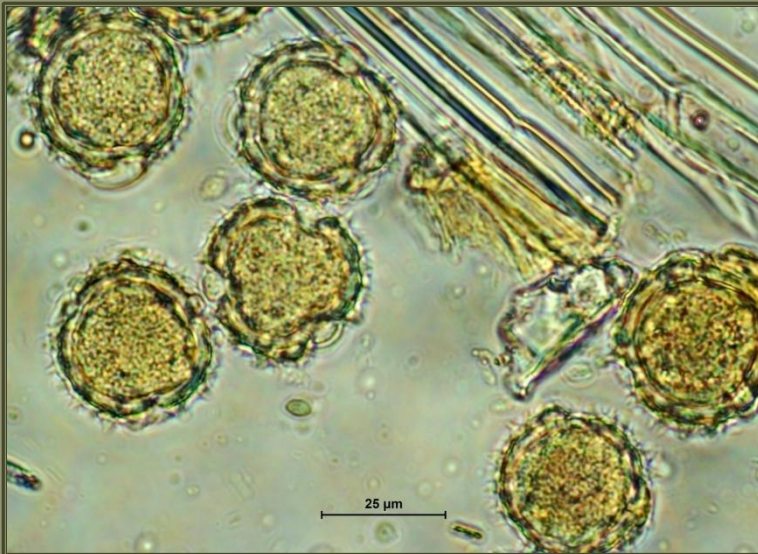
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 33  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*S. selloi* L. pollen grains, Uruguay. Pictures prepared using light microscopy.



Source: QSI

# *Senecio subulatus* Don ex Hook & Arn.

## Plant Description

Native to Argentina

### COMMON NAMES

-

### HABIT

Perennial herb, 50-100 cm high. Stems with leaves up to the flowers, many branches. leaves succulent, inflorescence open, bright yellow, later with its ray florets turned down. The calyculus bracts have acute apices, are more or less glabrous and not dark tipped. Flowers in clusters.

### HABITAT

On sandy, rocky soils, usually in dry, low fertility inland areas

### DISPERSAL

By wind (pappus)

## Plant Pictures

Pictures of plants, flowers, leaves, stems and fruiting parts of *S. subulatus* Don ex Hook & Arn. in Uruguay.



Source: QSI

# *Senecio subulatus* Don ex Hook & Arn.

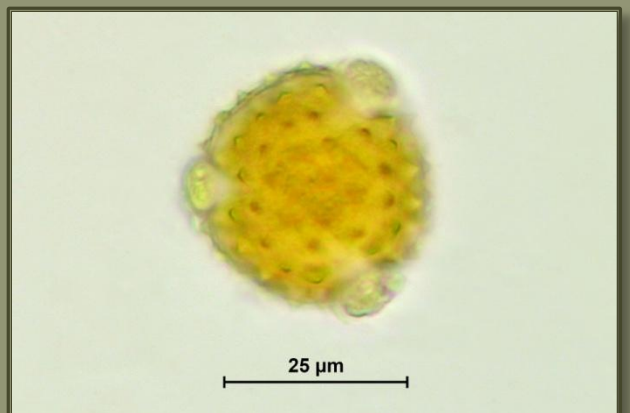
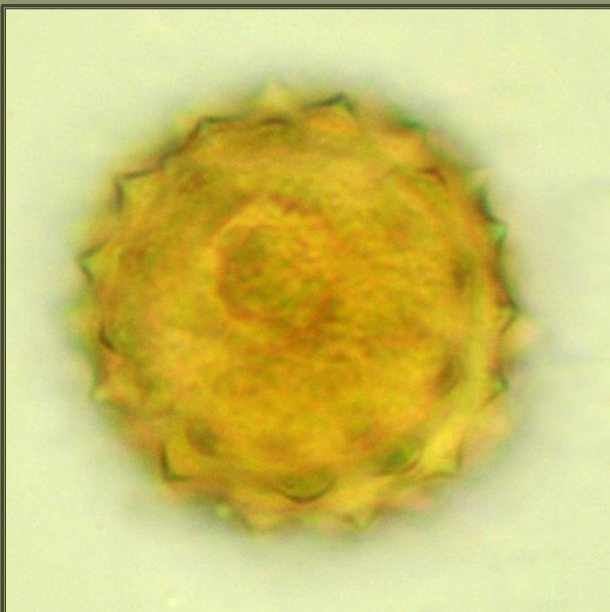
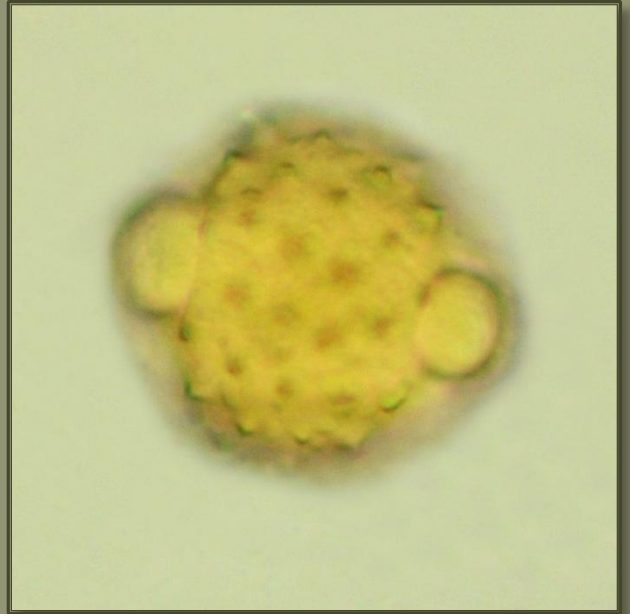
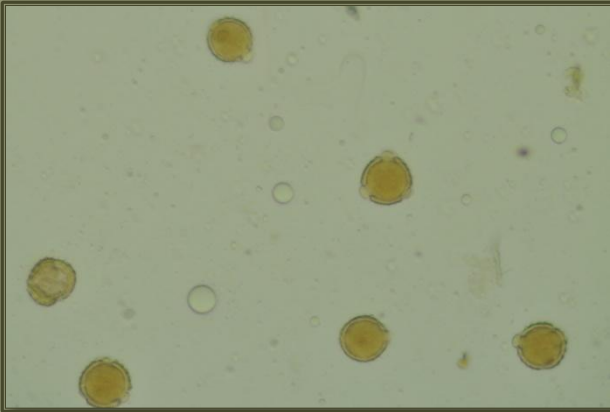
## Pollen Description

SHAPE: semiangular  
APERTURE TYPE: tricolporate

SIZE: ca. 33  $\mu\text{m}$   
EXINE TYPE: echinate

## Pollen Pictures

*Senecio subulatus* Don ex Hook & Arn. pollen grains. Pictures prepared using light microscopy.



# *Senecio vernalis* Waldst. & Kit.

## Plant Description

Native to Eastern Europe

### COMMON NAMES

Eastern Groundsel

### HABIT

Annual herb, 50-80 cm high. Stems erect, often reddish. Leaves wavy, wooly, hairs often get lost during adulteration of the plant. Dissected leaves with egg-shaped, toothed section, leaves alternate: one leaf per node along the stem. 6-12 connate sepals with bold tip, nearly black. Flower heads (diameter 2,5 cm) and 21 inner sepals, 13 ligular ray florets, bending down like bells, bright to gold-yellow, flowering from May to Octobre

### HABITAT

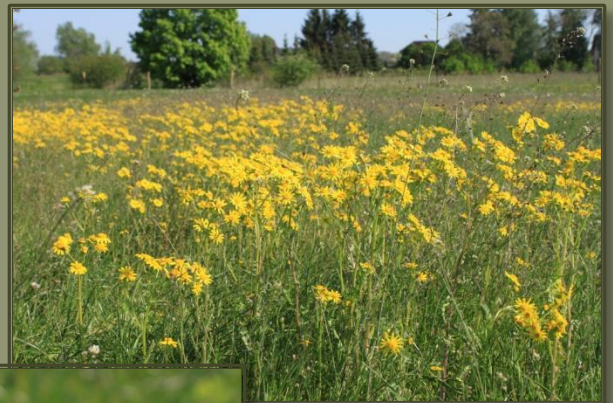
Cultivated lands, roadsides, edges of fields also ruderals

### DISPERSAL

By wind (pappus)

## Plant Pictures

Picture of flowers, leaves and stems of *S. vernalis* Waldst. & Kit.





# *Senecio vernalis* Waldst. & Kit.

## Pollen Description

SHAPE:

semiangular

SIZE:

ca. 24  $\mu$ m

APERTURE TYPE:

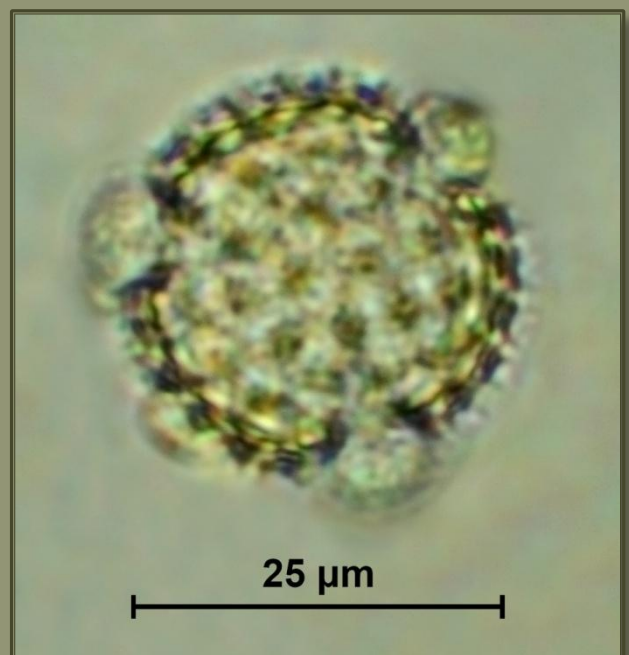
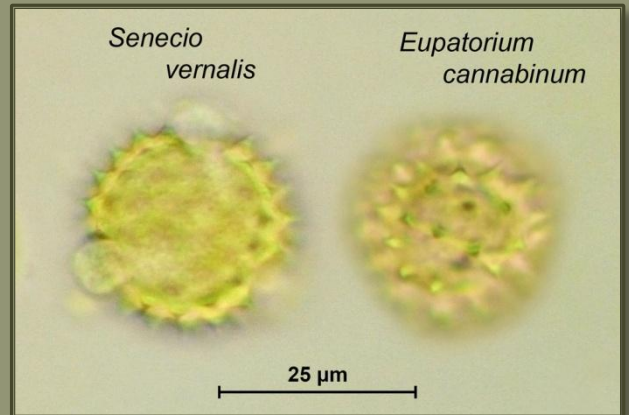
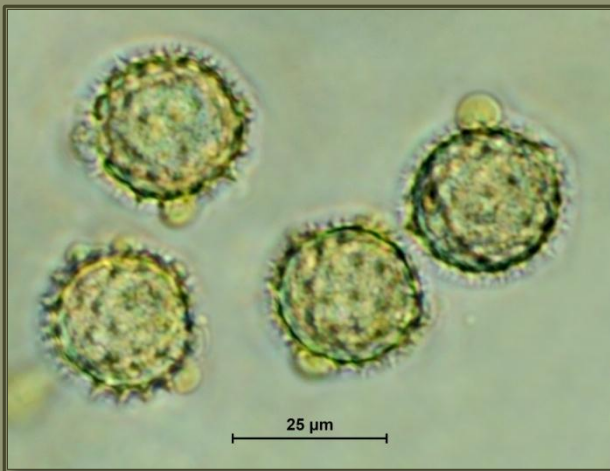
tricolporate

EXINE TYPE:

echinate

## Pollen Pictures

*Senecio vernalis* Waldst. & Kit. pollen grains. Pictures prepared using light microscopy.



Source: QSI

# *Symphytum officinale* L.

## Plant Description

Native to Europe

### COMMON NAMES

Common comfrey, quaker comfrey, boneset, knitbone, slippery-root, consuelda

### HABIT

Perennial herb, 30-120 cm high. Dark, turnip-like taproot up to 50 cm long. Often several clustered stems. Stem and flower cluster with spreading or bent back, stiff hairs. Leaves large, the basal ones stalked, with ovate or lance-ovate blade mostly 15-30 cm long and 7-12 cm wide. Stem leaves alternate, gradually reduced and with shorter stalks but still ample, the upper commonly stalkless. Flowers purple or dull blue, nodding, isolated clusters at end of side and top branches. Corolla about 15 mm long, narrowly bell-shaped, flowering from May to August, pollination by bees. Fruits nutlets, brownish-black, slightly wrinkled, about 4 mm long.

### HABITAT

In meadows, woods etc. near streams and rivers, often shady areas

### DISPERSAL

Seed dispersal by ants (elaiosome)

## Plant Pictures

Picture of flowers, leaves and stems of *S. officinale* L.

Source: QSI



# *Symphytum officinale* L.

## Pollen Description

SHAPE:

oval

SIZE:

23 x 27  $\mu\text{m}$

APERTURE TYPE:

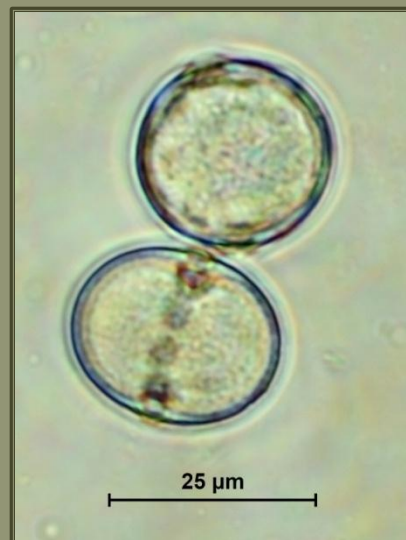
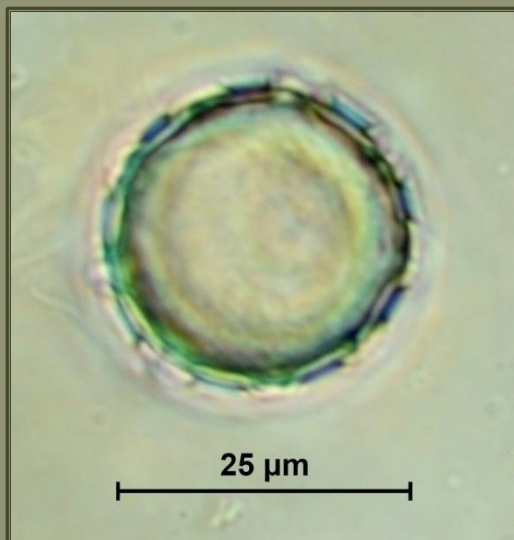
stephanocolporate

EXINE TYPE:

psilate

## Pollen Pictures

*S. officinale* L. pollen grains. Pictures prepared using light microscopy.



# *Tussilago farfara* L.

## Plant Description

Native to Europe, Africa, West- and East-Asia, invasive to North-America

### COMMON NAMES

Coltsfoot

### HABIT

Perennial herb, 10 to 30 cm high. Flowers appear (February to April) on stems with no apparent leaves (only scale leaves). Basket-shaped yellow flowers with 300 female ligulate florets and 30 to 40 male tubular florets. Leaves appear after withering of flowers, long petiolate, ground leveled, 10 to 20 cm wide, toothed, hearty or hoofed shape with pannose undersurface.

### HABITAT

Dry-warm, also waterlogged areas, permeable soils, embankments, quarries, waysides, ruderals

### DISPERSAL

Seeds by wind, rhizomes

## Plant Pictures

Pictures of flowers, leaves, stems and withering and seeding flowers of *T. farfara* L. in Germany



Source: QSI

# *Tussilago farfara* L.

## Pollen Description

SHAPE:

semiangular

SIZE:

ca. 37  $\mu\text{m}$

APERTURE TYPE:

tricolporate

EXINE TYPE:

echinate

## Pollen Pictures

*T. farfara* L. pollen grains. Pictures prepared using light microscopy.

