

# Carnivorous Plants – Guide for Growing 30 Species

By Christian J Schousboe, 2014

## Summary

The article gives practical and no-nonsense instructions to growing of 30 carnivorous (insectivorous) plants and a presentation of basic principles. The instructions are based on experiences from Danish window sills, in some cases supplemented with artificial lights. The instructions give information on the plants (description, origin and habitats, annual behaviour) and how to grow them (temperature, light, compost, container, propagation etc.). 1 *Byblis* species, 1 *Cephalotus* species, 1 *Dionaea* species, 12 *Drosera* species, 1 *Drosophyllum* species, *Nepenthes* species, 5 *Pinguicula* species, 4 *Sarracenia* species and 4 *Utricularia* species. Tables for converting cm to inches and Lux to Foot-candles are included. (Total 37 pages)

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## Basic principles

### Clever ones

Carnivorous plants are clever ones. They do not wait for insects and other small animals to die, drop to the ground, decompose and release nutritive compounds that plant roots can take up. No – the carnivorous plants have ‘invented a shortcut’: They catch living creatures, kill them, digest them, and keep the released nutritive compounds for themselves. This requires of course several specializations, especially some kind of effective traps. All traps found among the carnivorous plants are modified leaves. No flowers are involved in trapping insects for nutritive purposes - flowers are structures aiming at propagation; the expression “carnivorous flowers” is nonsense or a blunder.

### Prey Catching

Catching small animals for nutritive purposes enables the carnivorous plants to grow in very poor places or in niches where competition for nutrition is very tough.

This means that they do well with very poor composts and that they do not need fertilizing. The main ingredients in their compost are 1) non-enriched *Sphagnum* peat and 2) lime-free gravel, river sand or the like which makes the compost more porous especially when peat decomposition advances.

### Minerals / Water

Most carnivorous plants appreciate water with little or no minerals, i.e. rainwater. However, rainwater may be polluted with a number of unwanted substances. So if you use rainwater, don't collect it at times when farmers use herbicides etc. i.e. May-June and September-November (Denmark). Rainwater should be collected in (very) large containers and the container should be allowed to run full before the content is used. In this way you make the most of a dilution effect, and may hope that most of the unwanted substances have decomposed.

Do not believe that natural resources as founts, wells, creeks, rivers, ponds or lakes can supply ‘rainwater’. Hard water may be softened (decalcified) in several ways, some of which are fine (softening with oxalic acid) some are not so fine (filtering through peat, treatment with ammonia) and some are best left alone. Ion exchange may be excellent techniques, but be careful – in some cases Calcium ions are replaced by Sodium ions which means that hard water is changed to a soda dilution. On softening of hard water: Get advises from experienced aquarists.

Exception: Several *Pinguicula* species thrive on chalky soils and will tolerate hard water. See below.

### Fertilizers

Do not use fertilizers. If the carnivorous plants are placed on window sills where no prey is available, you might feed the plants regularly with small baits: Dead and dried *Drosophila* flies (fruit flies). These are great prey for small plants; use a pointed pair of tweezers or a moist small and pointed brush. Fruit flies are easily

captured from spring to late autumn; about rearing them consult terrarium or aquarium sites. When feeding *Drosophila* corpses use a pointed pair of tweezers or a moist small and pointed brush.

Until you get the feeling about how much and how often each plant individual should be fed don't ever feed more than 1/3 of the traps once a month. If in doubt – don't feed. Feeding young plants will be more rewarding than feeding mature plants.

If you grow *Dionaea* you probably (or your grandchildren) can't resist feeding the plant, but be careful – use flies, spiders, hoverflies etc.

Warning: Do never feed mince, meat lumps, sausage bits, dog biscuits, cat food or earthworms etc. to any carnivorous plants.

Exception: Nepenthes plants will benefit from an occasional spray with a diluted fertilizer (see below).

## **Pots**

Early in the last century the locally handmade flowerpots were substituted by cheaper machine manufactured ('pressed') clay pots, and this implied a standardization of sizes and proportions. In this case 'proportions' means the relation between depth and rim sizes, and this proportion were about 1:1 whether the pot was small or big. This proportion has been transferred to (majority of the) modern plastic pots. (With of the plastic pots' bottom vary a little among plastic pots - as well as in clay pots - but is this is of little importance when growing carnivorous plants.) An exception from this is the 'dwarf pot' with a depth:rim proportion about 1:1.4 or even 2:1. Dwarf pots are used for carnivorous plants with extended roots or subterranean stolons (e.g. *Cephalotus*). A dwarf pot may be substituted by a normal by using an appropriate layer of drain (e.g. polystyrene bits) and keeping the pot in a bed with raised water level.

New clay pots are fine for carnivorous plants, but used clay pots are not. Because the clay absorbs minerals, and carnivorous plants don't like minerals. Use plastic pots, they are cheap and may be cleaned and reused.

## **Sowing**

Sow on the same compost as for adult plants.

The general rule for seed sowing (cover the seed with a compost layer equalling the size of the seeds) goes for carnivorous plant seeds as well. But as the seeds in most cases are very small, you just disperse them on the smoothed compost surface, sprinkle thoroughly, cover with glass or transparent plastic and place the pot in a waterbed and other in suitable conditions. Next day spray with a fungicide. And wait.

If close humid conditions are maintained some seeds may germination within a few weeks others may take a few months. If no seedlings appear in due time + 50 %, you might cool the pot in a refrigerator for 1 – 3 months; this is said to improve germination in some cases.

If no seedlings appear you might consider these causes:

- 1) The seeds didn't have germination ability from the start.
- 2) The provider (or his provider) has been storing the seeds in unsuitable conditions or for too long.
- 3) You have been storing the seeds in unsuitable conditions or for too long.

- 4) You have sown the seeds on an unsuitable compost.
- 5) During the incubation period some unfavourable conditions may have occurred (drying out, heating, growth of moss or algae etc.).
- 6) Any combination of 1 – 5.

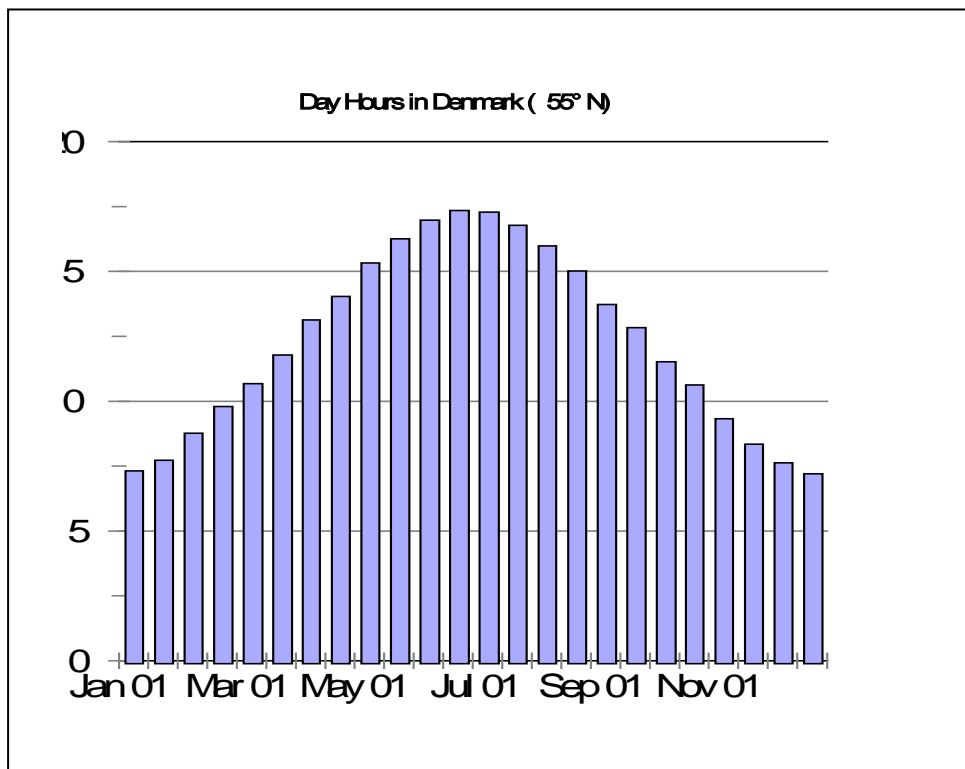
## Pests

Pests and diseases are no real problem.

- Aphids are washed down.
- Mealy bugs, scale insects and red spiders: Propagation is inhibited by regular spraying with water, and eliminated by repeated use of insecticides or by repeated spraying with diluted dissolution of soap.
- Mildew is eliminated by cutting off the affected parts and prevented by repeated use of a fungicide or a horticultural mineral oil application.
- Mould is eliminated and prevented by increased ventilation.

The principal climatic factor that influences plants on living room window sills is the annual variation in daylight hours.

As Denmark covers a rather limited area, the variation in Danish daylight hours can be illustrated fairly accurately by the variation at 55° N (below). This variation will cover other locations at about the same latitude. More southern locations will have less distinctly difference between day length at midwinter and midsummer, i.e. better growing conditions in winter.



## **Byblis liniflora**

**Description:** A little pretty and elegant plant with long flowering seasons. The erect stem has projecting thread narrow leaves 5 – 8 cm long and a little shorter flower scapes each with a single flower.

Stem, leaves as well as scapes are covered with long glandular hairs. The flowers are light bluish purple, and they open flat (about 0.8 cm) in bright light lasting about 8 days. When the plant reaches 20 – 30 cm it usually bends over unless supported. This species is annual, but *Byblis gigantea* is a perennial.

*B. liniflora* often look disappointing like *Drosera indica* (see *Drosera indica* below).

**Origin and habitats:** Queensland and north-western Australia: Sandy, moist places, e.g. riverbeds.

**Temperatures:** Room temperature 15 - 20 °C (59 – 68 °F) is fine, not more than 35 °C (95 °F). Plants may be placed outdoors in warm summers.

**Light:** Bright and preferably sunshine. Outdoors the plants should be protected from midday sun. The plants may be grown under artificial lights (12,000 Lux and 14 – 16-hour day).

**Compost:** Finely crumbled non-enriched *Sphagnum* peat with lime-free gravel (equal proportions or 2:1).

**Container:** Pots 10 - 12 cm deep.

**Location:** Bright west or east window sills with sunshine.

**Repotting:** Overwintering mature plants is not worthwhile. But if seedlings stop growing, a transplant might be beneficial.

**Annual behaviour:** Seeds may be sown as early as in late fall securing a prolonged flowering period. If sown April 1. flowering can be expected to start medio July (plants 10 cm).

**Propagation:** The species is self-fertile, but the flowers need to be shaken / vibrated to secure pollination. Dried seeds are stored in the refrigerator. Sow January-February under artificial lights or March-April on the window sill. Leaves may be used for vegetative propagation.

**Prey capture:** Even small plants may catch great numbers of small prey.

**Difficulties:** No, this species is easy to grow.

## **Cephalotus follicularis**

**Description:** Two types of rosetted leaves are produced: Normal (non-carnivorous) leaves and the pitchers. Both types are spaced regularly around the centre, but as the plant divides the regularity is blurred and the compost becomes covered by a mess of normal leaves and pitchers.

The normal leaves are pointed oval on short petioles (3 – 10 cm). The pitchers resemble thimbles with overhanging lids; these lids have very decorative whitish translucent areas. The 'bellies' of the thimbles have 3 prominent hairy lists that presumably are hard to cross by small crawling insects and thus lead upwards to the pitcher rim. The rim has longitudinal ridges ending in teeth on the inner margin. The pitchers are passive

traps – no part of them can move. The plants are 3 – 15 cm tall. Spreading rhizomes send up additional plants.

Several or numerous (100?) very small whitish-green flowers develop at the end of 20 – 50 cm upright or semi-erect stems.

**Origin and habitats:** This plant is found in very small numbers in the drier parts of the peaty swamps and bogs around St George's Sound (Esperance Bay), SW Australia. The locations have Mediterranean-like climate with warm dry summers and cool wet winters with occasional light frosts. The plants are found on peaty sand often partly shaded by grasses.

**Temperatures:** This species is very temperature tolerant. At 20 – 30 °C (68 – 86 °F) the plants will develop no or very few pitchers. Below 7 °C (45 °F) the leaves and pitchers will wither, but new leaves will develop when the temperature rises (spring). Cool summer nights are beneficial.

**Light:** In bright light the plant (especially the pitchers) turns to reds and purples. Keep the plants in light shade during development, and then expose them to the sun to give them the appealing reddish colour. Growing under artificial light is possible (15,000 Lux).

**Compost:** Mixture of non-enriched *Sphagnum* peat and lime-free gravel or river sand in the proportion 3:1 or 2:1.

**Container:** Dwarf pots 15 cm wide will give better room for rhizome development and for development of additional plants.

**Location:** Window sills are suitable, but remember to provide suitable shading and that the humidity should not be too low.

**Watering:** Keep the compost moist during the growing season, i.e. put the pot in a bed of 1 cm water, but let the water evaporate before more is added. During winter dormancy the compost should be kept damp – not moist.

**Repotting:** *Cephalotus* does not like repotting and should be left without disturbances until something must be done, i.e. until the decomposing of the compost makes it start to collapse.

**Annual behaviour:** During winter dormancy the foliage may wither or plants may stay perennial. Spring growth does not include pitchers; the pitchers develop in summer when insects are more plentiful. The species flowers in spring or later (July / August) in the Northern Hemisphere.

In culture at 20 – 25 °C (68 – 77 °F) continuous growth may be maintained all year, but dormancy may still happen and is usually followed by new growth after some 8 weeks.

**Propagation:** Seeds should be sown as freshly as possible. Keep them in a refrigerator, but sow within 2 months. Two weeks after sowing (and watering), cooling the pot in a refrigerator for 2 – 3 months is said to improve germination (after 4 – 10 weeks).

If close humid conditions are maintained some seeds may germinate within a few weeks others may take a few months. The seedlings grow rather slowly being mature after 3 to 4 growing seasons.

Vegetable propagation: Leaf cuttings are taken during spring or summer. The leaves (preferably mature/old leaves of both types) are simply pushed halfway down in moist peat or *Sphagnum*, sprayed with a fungicide,

protected from evaporation and placed at favourable temperature and light, but shaded from direct sunshine. The plantlets may not be visible until the spring.

Root cuttings may be used – see *Drosera filiformis*.

Older and established plants may be divided.

**Difficulties:** No difficulties, this species is easy to grow, but a slow grower.

## **Dionaea muscipula**

**Description:** Rosette of more or less prostrate leaves reaching 6 - 10 cm in length. Each leaf is divided in two – a spatulate proximal part (botanist regard this as a flattened petiole) and the terminal fantastic trap: Two lobes that when triggered snap up and (sometimes) catch the prey. The trap is triggered by sensible hairs on the lobes: Each lobe has 3 sensible hairs, and the trap will only be triggered if two hairs are touched simultaneously – or if one hair is touched twice within a certain time (2 – 20 seconds depending on temperature and the age of the leaf). Efficiency of the traps is increased by long stiff hairs on the lobe margins. When a prey is caught, the lobes release a liquid that contains digestive enzymes. After absorbing of the nutrition, the trap opens and is ready for the next prey. Each trap may digest 2 – 4 preys.

In bright light the lobes turn orange red or dark red. The flower scapes grow to 10 – 30 cm and carries an umbel of 3 – 15 white flowers, 1½ to 3 cm wide. The flowers come out in May-June each lasting 3 days.

A large number of forms are available mainly distinguishing themselves in these characters: Big stature; More or less prostrate or upright leaves; Short, broad or narrow leaves; Yellowish green, red or violet traps; Red or violet trap teeth; Trap teeth in excess; Tenuous trap teeth; No trap teeth – only blunt stubs; Doubled or otherwise deform traps. Lately a single dealer of carnivorous plants offered 101 forms of *Dionaea muscipula* – a part from 'Typical'.

**Origin and habitats:** Northern America (Carolina). *Dionaea* plants may be found in places with moist soil and often sparse bushes and trees. Soil surface consist of peat and underneath either clay or sandy soil (pH 4 – 5). Roots reach depths about 10 cm. The plants can survive fire, drought and light frost periods.

**Temperatures:** Never below 0 °C (32 °F), and not below 5 – 8 °C (41 – 46 °F) in winter. In summer the plants endure temperatures about 40 °C (104 °F). Temperatures should be lower at night than during day light.

**Light:** As bright as possible, but remember to provide ventilation during sunshine.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat with lime-free gravel (2:1 or 3:1). The mix must be acid (pH 5 - 6).

**Container:** Pots 10 - 12 cm deep.

**Watering:** Keep the compost moist during the growing season. Some cultivars prefer constant soaking (pot in a bed of ½ - 1 cm water) while others thrive better with only regular watering. If the plant does not thrive – try a change in watering conditions.



**Fertilizing:** Do not use fertilizers. But enjoy yourself by feeding small flies to the plant – this is great fun for kids of all ages.

**Location:** Bright window sills.

**Repotting:** After procuring a plant it should immediately be transferred to fresh compost. Annual repotting is done at the end of the resting period.

**Annual behaviour:** In fall the leaves wither and the plant starts a resting period: Cut off the dried leaves, place the pot in a dry saucer, keep the compost moist (not wet), and keep the temperature low 5 – 12 °C (41 – 54 °F). When new leaves develop the moisture is increased.

Resting plants may be removed from the compost and stored in the refrigerator: Spray the plant with a fungicide and place it in small plastic bag.

In bright winters (sun, snow) some leaves may keep green until spring: Keep the plant cool, moist and as bright as possible.

**Propagation:** Pollen must be transferred from one plant to another to secure seeds production (self-sterility) – use a small pointed brush. Seed development takes 5 – 6 weeks and the seeds are sown immediately or next spring after storing in the refrigerator. Germination is fastest at 20 – 25 °C (68 – 77 °F), and the seedlings are really cute.

Vegetative propagation: In summer mature and healthy looking leaves are removed, traps are cut off and the rest is placed on compost or the proximal part is lightly covered by compost; cover with glass or plastic to avoid evaporation and drying out. Plantlets will develop in 6 – 8 weeks if humidity is kept at 100 %, the temperature is 20 – 25 °C (68 - 77 °F) and if the light is bright (no direct sunshine). Likewise the fat leaf-bases from resting plants may be used in propagation.

Mature plants divide spontaneously and may be potted separately at the next repotting.

**Prey capture:** The trigger mechanism calls for prey types of a suitable size. Mature plants catch flies, hunting spiders and sometimes ants; midges are too small.

**Difficulties:** An easy plant to grow, but overwintering may be a little tricky; most of the plants sold to hobbyists succumb during winter because of too wet conditions.

## ***Drosera adelae***

**Description:** Rosette of more or less prostrate spatulate leaves 4 – 7 cm long and about 1.5 cm broad. They carry scattered red glandular hairs on the upper surface and on the margins. The flower scape is a little longer than the leaves, erect, and carries 10 – 25 flowers about 0.5 – 0.7 cm in size. The flowers are interesting – not because of their size – but their colour is unusual: Brownish purple. A variety with white flowers is known.

**Origin and habitats:** Origins from marshy places in the rainy parts of northern Queensland (Australia).

**Temperatures:** On window sills the plants should be protected from low night temperatures. The plant should be kept at temperatures below 10 °C (50 °F). Relatively high temperatures (e.g. in heated terrariums) are said to be beneficial.

**Light:** Prettier leaves are grown in bright light, but avoid midday sunshine during summer.

**Compost:** Chopped living *Sphagnum* moss or finely crumbled non-enriched *Sphagnum* peat with lime-free gravel. Some roughly grinded charcoal may be added.

**Container:** Pots 10 - 15 cm deep.

**Watering:** The compost must never dry out but watering should be moderate during winter (slow growth).

**Location:** Bright window sills without direct sunshine during summer. High humidity is beneficial.

**Repotting:** Only when necessary (decaying compost). Do not repot immediately after procuring the plant; only transfer the compost lump to a broader pot and fill with fresh compost.

**Annual behaviour:** Flowers a couple of times during summer. Growth is slower in winter.

Development may be unpredictable, as the plant suddenly may wither which however usually is followed by emergence of plantlets from the old roots, first and foremost along the pot side.

**Propagation:** This species is presumably self-sterile, so pollen must be transferred from one plant to another for securing seed production.

Vegetative propagation: Cut off leaves and roots willingly set new plantlets (see *Drosera filiformis*).

**Difficulties:** Unpredictable, but experiments are worthwhile.

## **Drosera aliciae**

**Description:** Rosette of closely spaced prostrate and spatulate leaves (2 – 3 cm long and 1 cm broad).

Upper r sides and margins carry red glandular hairs. Colouring increases in brighter light.

The flower scapes grow to 30 – 40 cm and carries 8 – 10 light purple flowers.

Variants have more or less coloured leaves and may have flowers in different shades of light purple.

**Origin:** South Africa.

**Temperatures:** 10 – 35 °C (50 – 95 °F). Night temperatures should preferably be 5 - 10 °C (41 - 50 °F) below day temperatures. Temperatures below 7 °C (45 °F) are lethal.

**Light:** As bright as possible, but without effective ventilation direct sunshine may cause harmful heating of the plants. Some shading is recommended.

**Compost:** About equal parts finely crumbled non-enriched *Sphagnum* peat and lime-free gravel.

**Container:** Pots 10 - 12 cm deep.

**Location:** Window sills are ideal, preferably facing east, south or west. This species may be grown under artificial lights and may be placed outdoors in summer.

**Annual behaviour:** On window sills this species may be active all year round; flowering periods from June to prime December.

**Propagation:** Some types of *D. aliciae* are self-fertile and form thus spontaneously many seeds. The seeds are ripe when the capsule darkens. Dried seeds are stored in the refrigerator and sown in the spring. Mature plants divide spontaneously and may be separated at the next repotting.

**Difficulties:** No, this species is easy to grow.

## **Drosera binata**

**Description:** Upright leaves develop from the 'head' situated in the compost surface. Petioles are stiff and projects upwards / outwards. Leaves are split into two long and narrow parts (Y-shaped) closely covered by glandulous hairs. Leaves may grow to 20 – 40 cm. Only glandular hairs – not the leaf – bend towards the prey.

The flower scape is somewhat taller than the leaves and carries a number of white flowers (light pink or light pink with white margins).

Principal forms in culture:

- *dichotoma* has leaves split two times.
- *multifida* is bigger (30 – 50 cm) and the leaves are split 4 – 8 times.
- *multifida extrema* are split 10 times or more.

**Origin and habitats:** East and southeast Australia, Tasmania and New Zealand. Plants may be found on acid and constant moist ground.

**Temperatures:** Room temperatures are OK. The plants may be placed outdoors the greater part of the year, but are not fully hardy; below 0 – 3 °C (32 – 37 °F) is lethal, so winter cover must be provided.

**Light:** This species prefers a bright position without strong sunshine.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat with some lime-free gravel. The compost should be acid (pH 4.5 – 5.5).

**Container:** Pots 10 - 12 cm deep.

**Location:** A good plant for east and west window sills.

**Repotting:** At the end of winter rest or later in spring.

**Annual behaviour:** At low temperatures the leaves will darken and wither leaving the starchy petioles.

Wintering can be done in the refrigerator at 5 – 7 °C (41 – 45 °F): Cut off the leaves and petioles, flush the compost with a fungicide, and put the lump into a plastic bag.

If the winter temperature can be maintained at 10 – 15 °C (50 – 59 °F) *Drosera binata multifida* may be grown without winter rest.

**Propagation:** The species is self-sterile, i.e. pollen must be transferred from one plant to another for securing seed development. The seeds are ripe when the capsule darkens. Dried seeds are stored in the refrigerator and sown in the spring. Varieties may be partly / completely sterile.

Vegetative propagation: Several parts of the plants may form plantlets if submersed: Leaves, petioles and flower scapes. Root pieces (2 cm) lightly covered with compost will produce plantlets.

**Difficulties:** No, this species is easy to grow.

**Prey capture:** Great potential for capturing small insects (midges) on window sills.

### **Drosera burmannii**

**Description:** A small species forming compact rosettes that normally spans only 1 – 1½ (2½) cm in diameter. Each leaf is rounded wedge-shaped and typically 0.8 – 1.0 cm long and 0.5 – 0.6 cm wide. The glandular hairs are long – especially those situated along the leaf rim.

Some forms can turn completely red in bright positions.

White flowers are produced in groups of 3 to 12 (30) on 6–15 cm tall purplish scapes. The small flowers open for only a short time and large amounts of seed are produced without any interference. The seeds are ripe a few weeks after flowering.

*D. burmannii* is one of the fastest-trapping sundews: The long glandular hairs bend within a few seconds after stimulation and may complete a bend of 180° in less than 20 seconds. Compare this to e.g. *D. capensis* whose glandular hairs will take several hours to surround even a small prey. (*Drosera glanduligera*, *pauciflora* and *scorpioides* are said to be as fast (?) as *burmannii*).

In nature *D. burmannii* is an annual.

A number of *burmannii* forms are cultivated, and they mainly differ in colour (leaves and glandular hairs) and rosette size.

**Origin and habitats:** This species originates from subtropical / tropical climates from Japan and Southeast Asia to Australia.

**Temperatures:** Summer days 20 °C (68 °F), nights 10 °C (50 °F); winter days 10 °C (50 °F), winter nights 5 °C (41 °F). More than 30 °C (85 °F) may be harmful.

**Light:** As bright as possible, but without effective ventilation direct sunshine may cause harmful heating of the plants.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel in proportions 1:1 or 2:1.

**Container:** Pots 10 cm deep or dwarf pots 12 cm wide.

**Fertilizing:** Do not use fertilizers. But enjoy yourself by feeding small dead flies (*Drosophila*) and watch the amazing speedy glandular hairs.

When fed very little – or not at all – the plants may develop red or pink coloration of the glandular hairs. If fed a lot, *Drosera burmannii* will (grow rapidly and) turn light green.

It has been stated that older plants tend to die off after flowering if it is not fed, i.e. feeding should help the plants to survive for another season.

**Location:** Bright window sills with some sunshine are ideal. The species may be placed outdoors in summer.

**Watering:** Keep the compost moist during the growing season, i.e. put the pot in a bed of 1 cm water.

**Repotting:** Do not try to repot *Drosera burmannii*; keep the plants as long as you feel for it and are able to - at that time you will have plenty of (seeds and) seedlings to transfer to new pots.

**Annual behaviour:**

*Drosera burmannii* can reach flowering maturity in 4 months or less if fed regularly.

The usual flowering season is in late summer and fall.

Although annual in nature, this species may survive for years when grown indoors during the cold months (See Fertilizing above).

If the temperature is high during the winter, the plants may produce small leaves but usually these don't carry droplets.

**Propagation:** Sowing of seeds is the only secure way to propagate this species.

**Difficulties:** No difficulties, this species is easy to grow.

## **Drosera capensis**

**Description:** Rosette of several petiolated (3 – 5 cm) leaves projecting upwards / side wards (about 10 cm long and 0.5 cm broad) of light green to red nuances depending on variety. Upper surfaces and margins are covered by glandular hairs. In bright positions the glandular hairs turn red. Soon after capture of a prey the nearby glandular hairs bend towards the 'victim' and gradually the leaf bends too like a hairpin with the prey in the angle. If the prey is of some size, the leaf may curl like a corkscrew and cover the prey.

The flower scape is long (20 – 30 cm) and carries 10 – 20 light purple flowers. Each flower lasts only a day or two, but as they come out little by little each scape will flower 3-4 weeks; and a single plant will put out several flower scapes during the season. On a window sill a single plant may have flowers most of the year. Several varieties are cultivated, e.g. Narrow leaved, Broad leaved, Narrow petioles, Red leaves and the very popular White with white flowers and pale green leaves.

**Origin and habitats:** South Africa, growing moist and marshy placed (pH 5 – 5.5) either in full sun or lightly shaded by grasses.

**Temperatures:** Not below 10 °C (50 °F), night temperatures should be 5 – 10 °C (41 - 50 °F) below day maximum.

**Light:** Beware of direct midday sunshine during summer. May be grown under artificial lights.

**Compost:** About equal parts finely crumbled non-enriched *Sphagnum* peat and lime-free gravel.

**Container:** Pots 10 - 12 cm deep.

**Location:** Window sills are ideal, preferably east, south or west. Pots may be placed outside the greater part of the year, but development is better indoors.

**Repotting:** Repot immediately after procuring the plant. Repot each or every second spring. Mature plants have a leaf-less stem; if this is not regarded as a charm, the stem may be covered by compost at the next repotting.

**Annual behaviour:** On most window sills this species will be active all year round. Temperatures below 2 °C (36 °F) are lethal, but at 5 – 10 °C (41 – 50 °F) the plant survives although the leaves may wither. In resting conditions the moisture should be decreased. Resting is interrupted by increasing temperatures.

**Propagation:** The species is self-fertile and produces many seeds in each capsule; the seeds are ripe when the capsule turns dark. Dried seeds are stored in the refrigerator and sown in the spring – or in winter under artificial lights.

Leaves, pieces of flower scapes or of thick roots are suitable for vegetative propagation.

Mature plants divide spontaneously and may be potted separately at the next repotting.

**Prey capture:** Excellent for capturing the tiny midges thriving in indoor plant composts.

**Difficulties:** No, this species is easy to grow.

## **Drosera filiformis**

**Description:** Long narrow leaves (10 – 40 cm long and 0.05 – 0.1 cm broad) with a short petiole. Leaves turn reddish in bright light. Only the neighbouring glandular hairs bend towards a prey. The flower scape raises 5 – 15 flowers above the leaves. Flowers (1.5 – 2 cm) are pink.

A number of varieties of this species are grown by enthusiasts:

- *D. filiformis tracyi* is in all characters bigger than *D. filiformis filiformis*, e.g. 2 cm flowers.
- All red.

**Origin and habitats:** Atlantic North America (New Jersey, Massachusetts). Plants may be found growing in moist and sandy places or in *Sphagnum* moss, often among scattered *Pinus* trees.

**Temperatures:** 12 – 40 °C (50 – 104 °F) in summer, between 3 and 7 °C (37 – 45 °F) in winter. Is said to be hardy or almost hardy in England; in Denmark winter covering would probably be necessary. The *tracyi*-variant does not endure temperatures below 0 °C (32 °F).

**Light:** This species should be placed in a very bright position, but it might be exaggerated especially on sills facing south and in greenhouses with poor ventilation.

**Compost:** About equal parts finely crumbled non-enriched *Sphagnum* peat and lime-free gravel. Compost must be acid (pH 4.5 – 5.5).

**Container:** Pots 10 - 12 cm deep.

**Location:** Will thrive on a bright window sill, preferable in sunshine.

**Repotting:** Every second year.

**Annual behaviour:** The leaves wither in fall and the plant overwinters as a resting 'bud' (hibernaculum). Place the pot in a cool place and keep low moisture for 3 – 4 months. Rest may be performed in a refrigerator.

**Propagation:** This species is self-fertile and will produce abundant seeds spontaneously. Dried seeds are kept in the refrigerator until sowing in the early spring. Some seeds may take several months to germinate. Vegetative propagation: Root cuttings may be used, but cut off leaves are said to be better).

Root cuttings: Take 3 - 5 cm long pieces of thick roots, put them on fresh compost and cover them lightly and partly with compost; spray carefully, keep compost moist and atmosphere humidity saturated (cover with a piece of glass) and keep in bright light but do not allow any direct sunshine.

Leaf cuttings: Remove the entire leaf including the petiole, place is on damp compost, keep the humidity high, the light bright and at a temperature from 20 to 28 °C (70 – 85 °F).

**Prey capture:** Great potential for capturing many types of small insects.

**Difficulties:** No, this species is easy to grow.

## **Drosera indica**

**Description:** The upright stem carries more or less scattered linear leaves several inches long and covered with glandular hairs radiating in all directions. Plants usually reach about 30 cm, but some forms might reach 60 cm. Flowers are carried in numbers of 3 - 20 on lateral axils and usually about 2 – 2½ cm big.

Naturally *D. indica* plants are annual, but most forms may be grown for at least 2 seasons.

A number of forms are known, and they mainly differ in:

- 1) Stature – some may reach 15 cm at the most, others reach 45 cm relying on other herbs/plants for support.
- 2) Flower colour – white, pink, purple nuances, red or orange.
- 3) Flower size may reach 3,5 cm in some forms.
- 4) Colour of the stamens is to be blood-red in some forms.
- 5) Surface sculpture of the seeds.
- 6) Colour of vegetable parts – all-red forms are reported.

One of the most popular forms is “Jacky Jack”: Moderate size and appealing red flowers.

*D. indica* often look disappointing like *Byblis* plants, but *Byblis* flowers are single, while *Drosera indica* carries several flowers (more than 50 in some cases) on each lateral axis.

**Origin and habitats:** Japan to India, Bangladesh, Hongkong, Gambia, Angola, South Africa, Borneo and Australia, mostly in tropical areas. Favourite habitats are moist places as creek and river margins, seepage areas and herb fields in river areas. In most cases the habitats regularly dries out which is met by the annual life strategy of *D. Indica*.

**Temperatures:** 15 – 32 °C (60 – 9 °F). Night temperatures somewhat below day temperatures may be beneficial.

**Light:** As bright as possible, but without effective ventilation direct sunshine may cause harmful heating of the plants.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel in proportions 1:1 or 2:1.

**Container:** Pots 10 cm deep.

**Location:** Window sills are ideal, preferably facing east, south or west. The species may be grown under artificial lights (e.g. terrarium) and may be placed outdoors in summer.

**Watering:** Keep the compost moist during the growing season, i.e. put the pot in a bed of 1 cm water.

**Repotting:** Do not repot *Drosera indica* as it is not worth while; instead repeat sowing each (early) spring.

**Annual behaviour:** Although naturally annual, this species may be active all year round; flowering during summer and fall.

**Propagation:** Some forms of *D. indica* forms spontaneously many seeds – others don't. If not, transfer pollen from one flowers one plant to flowers on another plant; use a small pointed brush. The seeds are ripe when the capsule darkens. Dried seeds are stored in the refrigerator and sown in the early spring. Germination may be improved at raised temperatures (24 - 30 °C; 75 – 86 °F).

Leaf cuttings are not suitable for this species.

**Difficulties:** No difficulties, this species is easy to grow.

## **Drosera peltata**

**Description:** Plants grow to 15 – 25 cm in height. From an initial leaf rosette a stem raises carrying scattered leaves. Rosette leaves are oval (0.4 x 0.8 cm) and their petiole is ca 1 cm; stem leaves are a little smaller. All leaves resemble an umbrella, i.e. they connect to the petiole not at the margin but a little 'inside' the margin.

The flower scape carries 2 - 10 light pink or white flowers (1 cm).

The bulb is about 1 cm; underground runners form new bulbs and subsequent new plants.

**Origin and habitats:** Japan, Asia and Australia. Is found on moist grounds in rocky areas where summers are very hot and dry.



**Temperatures:** Between 4 and 25 °C (39 – 77 °F) during the growing season and 18 – 30 °C (64 – 86 °F) during the rest. Frost is lethal to the bulb. In outdoor experiments the compost must be very draining (almost pure lime-free gravel) and effective protection against moisture and frost must be established.

**Light:** Semi-shade. If the growing season is in winter the plants should have as much light as possible. May be grown under artificial lights (10,000 – 12,000 Lux and 8 – 10-hour day).

**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (1:2). The compost must be acid (pH 4.5 – 6).

**Container:** Pots 15 - 20 cm deep.

**Watering:** During the growing season the compost should be moist, but dry during dormancy (only occasional misting).

**Repotting:** Repot at the end of a resting period. Make a 5 cm deep hollow in the centre of the new compost, put the bulb at the bottom (be sure not to place it upside-down) and fill up with pure lime-free sand / fine gravel.

**Annual behaviour:** At the end of the growing season leaves and stems will wither: The plant is entering into the resting period. As this happens you must allow the compost to dry out gradually. The rest should last 6-8 months and is terminated by recurring moisture. If you gradually shift the date of first cautious misting / watering it should be possible gradually to accustom the plant to be active in the preferred part of the year.

**Propagation:** This species is self-fertile and usually produce a fair amount of seeds. If the seeds do not germinate within a month the pot should be dried out and re-watered a month later; this may trick may be repeated several times.

Cut off leaves are said to be usable in vegetable propagation, but of course 'daughter' bulbs are more reliable.

**Prey capture:** Great potential for catching small flying insects.

**Difficulties:** Yes – this is not an easy plant to grow, but easier than the other bulb-*Drosera*.

## **Drosera prolifera**

**Description:** The rosetted leaves are roundly kidney shaped (1½ - 2 cm) and held semi-erect on long (5 - 10 cm) and thin leaf stalks. The leaves are lettuce green with red glandular hairs. The flower scapes are thin and long and prostrated carrying a few (1 – 6) small auburn flowers that rarely produce seeds. At the end of each flower scape a plantlet will form, and such offspring is the principal way of (vegetative) propagation in this species.

**Origin and habitats:** This species originates from Queensland (Australia) where is it found in humid, shaded tropical rain forests with little temperature extremes.

**Temperatures:** 13 – 27 °C (55 – 80 °F).

**Light:** Lightly shaded through the day: should never be exposed to strong sunlight.

**Compost:** Long-fibered *Sphagnum* peat or chopped (living) *Sphagnum* moss is fine, but finely crumbled non-enriched *Sphagnum* peat and lime-free gravel in proportions 1:1 will do.

**Container:** Pots 10 cm wide and preferably rather wide as this will make room for the plantlets.

**Fertilizing:** Do not use any fertilizer. Feeding small insects etc. may be beneficial.

**Location:** Put the plants on a window sill protected from direct sunshine and with high humidity. This species is easily maintained under artificial lights, i.e. well suited for growing in for terrariums and wardian cases.

**Watering:** Keep the compost moist at all times, i.e. put the pot in a bed of 1 cm water.

**Repotting:** It is not worth while repotting this species; instead populate new pots with a few plantlets.

**Annual behaviour:** Kept in suitable conditions this species will grow continuously through the year.

**Propagation:** Seed production is rather unusual, but if seeds are produced, they willingly germinate to new plants.

Vegetative propagation: In nature and culture this species propagate by means of the plantlets forming at the end of the prostrate flower scapes. Leaf and root cuttings by be used (see *Drosera filiformis*).

**Difficulties:** No, this species is easy to grow.

## **Drosera pulchella**

**Description:** This is one of the charming Australian dwarf- or pygmy-*Drosera*. The rosette leaves are prostrate, petioles narrow and the leaf nearly circular; mature rosettes are no more than 1½ - 2 cm across. The flower scape carries 2 – 4 coral red (light rosy or salmon coloured) flowers. Each flower is 0.7 – 0.9 cm and has 5 petals.

A number of forms are grown, mainly differing in flower colour: Orange, pink, salmon or white.

The name *pulchella* means the-little-pretty-one, and this is most appropriate!

**Origin and habitats:** Southwest Australia. Found on sandy humus-grounds, at sandy founts, and among moss on granite cliffs.

**Temperatures:** Room temperatures are OK: Summer 15 – 25 °C (59 – 77 °F), winter 10 – 20 °C (50 – 68 °F).

**Light:** Bright light, but no direct midday sunshine during summer.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (3:1).

**Container:** Pots 10 - 12 cm deep.

**Watering:** The compost should never be allowed to dry out, but more water should be given during the growing season than in winter.

**Location:** On window sills facing west and south some shadow should be provided. During winter the pots should be placed near the panes, but remember to provide some protection during cold nights.

**Repotting:** Plant size makes repotting a troublesome process but pointed tweezers and toothpicks will make it possible.

Keeping up your stock of plants should preferably be done by annually renewing by using the gemmae.

**Annual behaviour:** Flowers will appear June-August. On the window sills gemmae will be produced during winter: Small (0.05 cm) flat, oval, green bodies that are easily spread. The gemmae (comparable to modified leaves) are produced in the centre of the tiny rosettes.

**Propagation:** *D. pulchella* is self-fertile and forms seeds spontaneously; sow them fresh or keep them dry in the refrigerator until sowing in the spring.

For easy increase of plant numbers use the gemmae: Transfer them to the surface of fresh compost by means of a toothpick or at pointed brush. Plantlets should appear in a week or two.

**Prey capture:** Only small prey specimens (springtails, midges) are caught by the small traps.

**Difficulties:** May be regarded as tricky until you get the 'feeling'; attention is needed.

## **Drosera pygmaea**

**Description:** Rosette of prostrated leaves (petioles 0.4 – 0.7 cm) with numerous red glandular hairs; the laminae are about 0.2 cm. The rosettes grow to about 2 cm.

The flower scape is hair like and about 1 cm tall, carrying a single 4-sepaled white flower. Flowers only last for a single day and some varieties do not open their flowers unless in sunshine or very bright light.

Popular varieties:

- Green form.
- All Green.
- Eastern Australia.
- Tasmania.

**Origin and habitats:** Western Australia. Plants may be found growing on constantly marshy grounds shaded by other plants. Summers are dry and warm 18 – 40 °C (64 – 104 °F), the winters rainy and cool 3 – 22 °C (37 – 72 °F) with occasionally light morning frosts. Winter is the natural growing period.

**Temperatures:** This species may be grown at widely different temperatures. On Danish window sills the short days without much light will constitute the resting period, and the winter temperature should thus be kept low, i.e. about 10 °C (50 °F). The plants may be placed outdoors the greater part of the summer.

**Light:** Semi-shade during the summer, in winter as much light as possible. May be grown under artificial lights (10,000 Lux and 14-hour day).

**Compost:** About equal parts finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (2:1 or 1:1).

**Container:** Pots 10 - 12 cm deep.

**Location:** This species will thrive on sills facing west or east.

**Repotting:** Do only repot at the beginning of other growing season. Each plant has a surprisingly great amount of roots and they should not be disturbed more than necessary. Stock may be maintained by gemmae.

**Annual behaviour:** Mature plants in growth will flower several times during the season. During the resting period each plant will form numerous gemmae.

**Propagation:** The species is self-fertile and will form viable seeds without any interference. The seeds will germinate better after a few months in the refrigerator.

Gemmae: see *Drosera pulchella*.

Mature plants may divide spontaneously and may be potted separately.

**Prey capture:** See *Drosera pulchella*.

**Difficulties:** Although the least difficult of the pygmy (dwarf) *Drosera* it may tease you.

## **Drosera spathulata**

**Description:** Rosette of prostrate round or oval leaves ( $\frac{1}{2}$  cm) on narrow petioles. Rosettes up to 5 cm. Leaves and their glandular hairs will turn red if the light is bright.

The flowering scapes may reach 25 cm. Each flower last only a single day, but as they come out a few at a time the flowering lasts much longer. Each mature plant will produce several flowering scapes during the season.

This species is found in widely distributed and is known in several varieties, e.g.:

- Kansai (Japan) with long petioles and pink flowers.
- Kanto (Japan and Australia) with broad petioles not distinctly separated from the leaf.
- Ahipara (New Zealand) with white flowers.
- *Var. lovellae*.
- Grey rounded.

**Origin and habitats:** Occurs on acid and moist ground in a vast area range from southern Japan, China, Philippines, Eastern Australia and New Zealand.

**Temperatures:** 15 – 24 °C (59 – 75 °F) in winter and 18 – 35 °C (64 – 95 °F) in summer. Night temperatures should be lower than day maximum. Plants may be placed outdoors in the summer.

**Light:** Bright position, but if the plants are exposed to direct midday sunshine during the summer, the ventilation must be effective.

**Compost:** About equal parts finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (2:1 or 3:1).

**Container:** Pots 10 - 12 cm deep.

**Location:** Bright window sills.

**Repotting:** In the late spring every second or third year.

**Annual behaviour:** Plants will most often grow 12 months a year, however slower during winter.

**Propagation:** The species is self-fertile and produces seeds in abundance. Dried seeds are kept in the refrigerator until sowing time in the spring (March-April).

Leaf cuttings are not suitable for this species, root cuttings are far more reliable (see *Drosera filiformis*).

**Difficulties:** None, this species is easy to grow.

### **Drosophyllum lusitanicum**

**Description:** The living line-shaped leaves (10 – 20 cm) are situated at the top of the erect lignified stem – old dead leaves hanging beneath them. As the stem branches out the plant may look like a small bush (100 cm) with more or less bending branches (up to 1 cm thick). All parts of the plant are densely covered with glandular hairs that in bright light will turn red. Branching flower scapes carry bright yellow flowers (3 – 4 cm) that will close up at night.

*D. lusitanicum* is a perennial with a potential life time of 10 (50, 100?) years.

**Origin and habitats:** This species is found on both sides of the Gibraltar Strait in sandy / gravelly places, often on chalk cliffs near the sea. During the long dry summer the plant must do with night dew only.

Annually the temperature ranges between 3 and 40 °C (37 – 104 °F) and hoarfrosts occur.

**Temperatures:** Between 10 °C (50 °F) at night and 28 °C (82 °F).

**Light:** As bright as possible all year round – and ventilation.

**Watering:** Watering should be very restrained during summer (May – September): Only a little squirt when the compost is nearly dry. During the rest of the year watering should be even scarcer. Exaggerating the dryness will make the droplets disappear from the leaves.

If you really want to grow this peculiar and showy plant you may use this recipe:

Take a clay pot (10 - 12 cm across) and provide it with a wick (2 - 3 cm broad strip) of some sort of dishrag protruding through the drain hole. Fill ¼ of the pot with drainage materials and the rest with a compost made out of *Sphagnum* peat, potting soil and gravel (may contain chalk) in the approximate proportions 2:2:1½.

Sow a few seeds in the pot. Put the pot in a 2 cm water bed until the compost is soaked, then remove the pot and cover it to prevent evaporation and to exclude light. Germination may take 3 – 6 weeks. When the first sprout is seen the cover is removed and the pot is placed in daylight; moisture is maintained by watering in the saucer – do never supply water from above.

Weaker sprouts are cut off – keep only one. When the seedling has 6 – 8 leaves is it time to establish a permanent growing method.

Find a clay pot of double size, provide it with ¼ drainage material, fill it ½ up with compost, and put the seedling pot in it. Fill the space with lightly packed *Sphagnum* moss and place the thing in a bright and sunny place. Hereafter water should be given only by moistening the *Sphagnum* moss: During the summer the moss should be kept moist, in winter dry but not crunchy.

The trick is that the roots gradually will protrude into the larger pot, and secure beneficial conditions for a number of years. Do not disturb the roots in any way, and do not repot at any rate.

**Propagation:** The species is self-fertile and the seed production is ample. Seeds may take 3 – 4 years to germinate, but if the seed coat is injured (light grinding on sandpaper or cutting off a tiny ‘corner’) the germination may be accelerated. Seeds should be covered by compost (½ cm).

**Difficulties:** After procuring a plant one must consider whether the plant should be maintained in the pot / compost or whether some sort of double-pot system should be used. Do never repot a *Drosophyllum!*

## **Nepenthes sp.**

**Description:** Nepenthes plants are climbers (20 to 2,000 cm) with lanceolate or narrow oval leaves that terminate in a tendril or a tendril that at its end expands to one of the famous pitfall traps - pitchers. These may be shaped like a jar or pitcher always held upright and at their mouth they carry a ‘lid’. The inner side the pitchers may be divided into 3 zones: a) Upper zone – a thick stabilizing structure that may secrete sugar components, b) the sliding zone which is smooth and covered with wax and downwards protruding hairs, and c) the glandular zone where watery digestive enzymes are secreted and nutrition is absorbed.

Small unimpressive flowers are situated in a terminal bunch, and every single plant is either male or female. Nepenthes plants are mainly grown for their interesting, decorative and in some cases spectacular pitchers (5 – 35 cm), which often possess showy characteristics – form and colours – varying greatly from one species to another, and often from ‘lower ones’ to upper ones’ on the same individual. In addition the form and colour of the pitchers may be influenced by growing conditions (mainly brightness of light). The pitchers are passive traps – no parts of them can move.

Natural hybrids are known, and artificial hybrids constitute the main part of cultivated specimens.

**Origin:** These species originate from southern and south-eastern Asia, Indomalaysia, New Caledonia, Australia and Madagascar; Borneo and Sumatra are especially rich in species.

**Temperatures:** Species from lowlands: Minimum 21 °C (70 °F).

Species from highlands: Winter days 18 – 22 °C (64 – 72 °F), winter nights minimum 11 °C (52 °F), summer days 22 – 35 °C (72 – 95 °F), summer nights 11 – 15 °C (52 – 59 °F).

**Light:** Nepenthes are shadow plants that do not thrive in (summer) sunshine. Bright positions are preferred and sunshine may be endured in winter. In too little light the pitcher traps will turn pale.

**Compost:** Non-enriched *Sphagnum* peat with pieces of *Pinus* bark, leca and/or charcoal pieces; living chopped *Sphagnum* moss may be added. Most commercial compost types for orchids (*Phalaenopsis*) are suitable.

**Container:** Pots (15 – 20 cm deep) preferably with big holes in bottom and sides, or (for bigger plants in greenhouses and conservatories) baskets made of plastic, metal web or wooden lists – as some orchid growers use them.

**Fertilizing:** Spraying the leaves with a weak fertilizer may be beneficial, but it should be much weaker (1/4) than used for annual plants as *Pelargonium* etc.

**Repotting:** This is a rare event. If necessary, remove all old compost without damaging the roots more than needed, and gently stuff new compost in between the roots and fill up the new container. Or simply remove the compost lump from the old container, place it in the new container and fill it up with new compost.

**Annual behaviour:** Should be growing all year round – no distinct resting period.

**Propagation:** Propagation by seeds is difficult, uncertain and slow.

Vegetative propagation: 3-leaved branch cuttings taken in February-May are best: The lower leaf is removed and the other two are cut back to half their length, use a fungicide and a root promoting hormone, compost could be pure *Sphagnum* peat, 100 % humidity and 20 – 25 °C (68 – 77 °F) should be ensured; if the light is bright (no direct sunshine) rooting will take 2 – 3 months.

Air layering or traditional layering is an obvious alternative.

**Prey capture:** The pitchers may capture a wide spectrum of animals including crawling and flying insects some of which will be attracted by sugar substances.

**Difficulties:** No, in suitable conditions (especially temperature and humidity) *Nepenthes* plants are easy to grow.

Note: *Nepenthes* may be grown in ordinary living rooms, but development of the pitchers may be entirely prevented (drying out of young tendril tips) which deprive the plants from their major attraction. The humidity in greenhouses or conservatories will benefit development of the pitchers.

Easy species for terrariums and wardian cases:

*Nepenthes alata*, highlands (or lowlands), modest sized plant.

*Nepenthes ampullaria*, lowlands, small plant.

*Nepenthes gracilis*: lowlands, small plant.

*Nepenthes rafflesiana*, lowlands, larger plant that tolerates pruning / reducing, appreciates a little sunshine.

*Nepenthes tentaculata*: highlands, miniature plant.

*Nepenthes ventricosa*: highlands, modest sized plant.

## **Pinguicula agnata**

**Description:** Rosettes with many light green prostrate leaves (3 – 5 cm long and 1 – 1.5 cm broad). Summer leaves have curved-in margins; winter leaves are narrow and lack prey catching ability. Flower scapes grow to 15 cm, the single flower is light purple and large in proportion to the plant: 1.5 - 3 cm. The spur is long and slender. May flower all year and often with more than one flower at a time.

A number of varieties are popular (White flower, Scented flower, *Var. Tamaulipes*, and Hildago).

**Compost:** The compost has major impact on plant size.

In finely crumbled non-enriched *Sphagnum* peat with topsoil (3:1 to 2:1) the plants rosettes may reach 4 -5 cm, while thy in pure topsoil may reach 10 cm. In pure *Sphagnum* peat all leaves will grow tiny proximal plantlets and the rosettes will turn into heaps of plantlets that do not thrive.

These observations are done with hard water and will probably differ with other types of water and of topsoil. So you may easily design your own experiments!

**Temperatures:** Day temperatures during the growing season 10 – 30 °C (50 – 86 °F) and differences between nights and days. Winter: Not below 5 °C (41 °F).

**Annual behaviour:** On window sills this species may be growing throughout the year. Development of winter leaves do not necessarily interrupt flowering.

**Propagation:** Easy and fast using leaf cuttings (see *Drosera filiformis*); winter leaves easily break of. Mature plants may divide spontaneously and each may be potted separately.

**Difficulties:** No, this species is easy to grow.

See *Pinguicula moranensis* (below).

## **Pinguicula grandiflora**

**Description:** Rosette of elongated oblong and prostrate leaves (4 – 6 cm long); their margins are curled-up. Flower scapes reach 10 – 12 cm and the single flowers are dark blue violet with purple lines, white throat and a prominent spur.

Variants are known and their names reflect the colour of the flowers (e.g. *pallida* = pale and *rosea* = rosy) or the original locality.

**Origin and habitats:** Europe. Plants may be found in moist places with acid or alkaline ground.

**Temperatures:** Summer 10 – 25 °C (50 – 77 °F) during the day, cooler at night. In September-October the night temperature should be lowered to secure development of a solid hibernaculum (resting 'bud'). Plants may be placed outdoor during summer. Winter: 0 – 3 °C (32 – 37 °F).

**Light:** Semi-shade.



**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (about 3:1). Addition of leaf soil may be profitable. Plants from alkaline habitats should be grown in compost with addition of lime / chalk, e.g. crushed dolomite.

**Container:** Pots 10 - 12 cm wide.

**Location:** Window sills facing north or east are suitable. If facing west or south some shadow should be provided from March to September. Outside a position in a pond front will be excellent, e.g. among (lime) stones, or at the basis (east or north side) of a big stone in the rockery.

**Repotting:** Transfer the hibernaculum to fresh compost at the end of the winter rest.

**Annual behaviour:** In fall the leaves wither and the plant rests as a greenish brown resting 'bud' (hibernaculum) visible in the middle of the withered leaves.

**Propagation:** *Pinguicula* species are self-sterile and pollen must be transferred from one plant to another to secure development of viable seeds. Seeds may be sown at once or dried seeds may be stored in the refrigerator until spring.

Vegetative propagation: Propagation by means of leaf cutting is possible.

At the base of the hibernaculum at number (5 – 15) small adventives 'buds' are found; they are easy to release and each may give rise to a plantlet if treated as miniature hibernaculums.

Mature plants may divide spontaneously and each may be potted separately.

**Prey capture:** Some midges but nothing much (on window sills).

**Difficulties:** No, this species is easy to grow indoors as well as outdoors. If plants don't thrive, the compost may be too acid or too alkaline. Try to find information of what mixture the plants are used to.

## **Pinguicula gypsicola**

**Description:** This small *Pinguicula* has a long narrow summer leaves (5 - 10 cm long) tapering from a 0.5 cm broad basis to the tip; they are light green and has numerous tiny sessile glandular hairs. The winter leaves are much shorter ( $\frac{1}{2}$  -  $1\frac{1}{2}$  cm) and the winter rosette is flat or weakly domed.

The flowers resemble *P. moranensis* but the petals are narrower. The colour is dark purple with darker lines and the throat is yellowish white; flowers last 3 – 5 weeks. The spur is tenuous and 2 –  $2\frac{1}{2}$  cm long.

**Origin:** Mexico.

**Temperatures:** Room temperature with cooler nights.

**Light:** Semi-shade.

**Compost:** The compost must be alkaline, e.g. finely crumbled non-enriched *Sphagnum* peat with crushed limestone or chalk (1:1). Or a piece of porous limestone may be used: Make a hole (about  $\frac{1}{2}$  -  $1 \times \frac{1}{2}$  - 1 cm or greater) in the stone and place a plant in each hole.

The name *gypsicola* means growing on or among plaster / chalk. If the compost is too acid the plant will form a little domed winter rosette without proper roots.

**Container:** Little or medium pot.

**Location:** Bright window sill without direct sunshine.

**Repotting:** This should be done every second or third year preferable in the early summer. If the plants are grown in a limestone they should be transferred to new holes more often.

**Annual behaviour:** Winter rosettes need only a little water from time to time. In spring and summer the active growth and flowering will need more moist conditions but sporadic light droughts will be tolerated. Flowers from early summer until fall.

**Propagation:** Vegetative propagation is easy: Winter leaves are easily broken off and readily form new plantlets.

**Prey capture:** Many small insects may be caught during the summer (window sills).

**Difficulties:** No, this species is easy to grow.

### **Pinguicula moranensis**

**Description:** Rosette of light green leaves. Summer leaves are elongated oblong and prostrate (10 cm long and 5 cm broad). Upper surfaces are oily sticky and make up the prey catching 'flypapers'; the margins are curled-up. Winter leaves are darker green, narrower, shorter and lack prey catching ability, i.e. their surface is dry. Flower scapes are 15 – 25 cm each with a single large flower (4 – 5 cm) with a long spur. The colour varies from red purple / violet red to rosy and grey magenta. Both summer and winter rosettes may give rise to flowers.

A white flowering variety is known.

Several varieties are widely grown by hobbyists.

- *Pinguicula moranensis* 'Kirkbright': Summer leaves are nearly all of the same size and the rosette is geometrically regular; a very appealing plant. 180 – 200 winter leaves make up the flat winter rosette (4½ cm). The first flower comes out as the first summer leaf is seen in the middle of the winter rosette, and flowering goes on until midsummer. The flowers are 3.5 cm, purple or dark violet and they last 4 weeks.
- *Pinguicula moranensis* 'La Vuelta': Summer leaves are broadly tongue-shaped, 5 cm long, grass green with a red tint on the curved-in margins. 30 – 50 winter leaves are narrowly (0.4 – 0.8 cm) tongue-shaped and are nearly upright with the tip bent backwards. The first flower comes out as the first summer leaves are seen and flowering goes on until medio August or September. The flowers are 3 cm, dark red violet as young, but they darken during the first week; lasts for 4 weeks.

- *Pinguicula moranensis* 'Molango': Summer leaves are broadly egg-shaped with a narrower 'petiole'. The colour is dull light green with paler middle nerve and violet tinted curved-up margins. The weakly domed winter rosette (4 cm) consists of 50 – 60 small fat leaves. The first flower comes out as the tip of the first summer leaf can be seen and flowering goes on until ultimo October. Flowers are 2½ cm and variegated: Basic colour is bluish violet and some lines are darker some paler. In bright light the colours will fade, which does not decrease the charm of the plant. Flowers last for 3 weeks.
- *Pinguicula* x 'Weser' is a hybrid (*P. moranensis* x *P. ehlersae*). It resembles *moranensis* very much, but the petals are more rounded and colouring more uniform and more bluish.

**Origin and habitats:** Mexico. May be found in moist woods with peaty ground; pH varies widely (acid, neutral or alkaline) and droughts may occur.

**Temperatures:** Summer day temperatures 18 – 30 °C (64 – 86 °F), preferably cooler nights. Winter: 3 – 10 °C (37 – 50 °F). May be placed outdoor the greater part of the year.

**Light:** Semi-shade. May be grown under artificial lights (10,000 Lux).

**Compost:** Finely crumbled non-enriched *Sphagnum* peat mixed with topsoil (2:1 or 3:1) and a little lime-free gravel.

**Container:** Pots 10 - 12 cm wide.

**Watering:** During the growing season the compost must be kept evenly moist. Some growers place the pots in a bed of water (½ cm) while others prefer regular watering. Winter rosettes should be only given a little moist. This species as well as other *Pinguicula* endure or even prefer tap water to rainwater and decalcified water.

**Location:** Window sills facing north or east is suitable; west and south sills should be provided with some shadow (March – September).

**Repotting:** In early summer.

**Annual behaviour:** The big summer leaves will develop during early summer and summer. In the fall or as late as in January-February the small winter leaves will appear. Growth continues during the winter but will be slow, and winter leaves cannot catch any prey. Some growers keep the plant completely dry in winter but that requires high humidity; on window sills sporadic watering is needed. Flowering may continue through the year except 1 – 1½ winter months.

**Propagation:** *Pinguicula* species are self-sterile and pollen must be transferred from one plant to another to secure development of viable seeds. Seeds may be sown at once or dried seeds may be stored in the refrigerator until spring. Seed plants may flower 2 – 3 years after sowing.

Vegetative propagation: Use summer or (easier) winter leaves (see *Drosera filiformis*). Several winter leaves may be picked from a winter rosette without harming the plant. Plantlets from leaf cuttings may flower within 1 or 1½ year.

Mature plants may divide spontaneously and each may be potted separately.

**Difficulties:** No, this species is easy to grow.

**Prey capture:** *P. moranensis* may catch moderate numbers of small insects if grown on window sills; outdoor the catch may be quite striking.

### **Pinguicula primuliflora**

**Description:** A somewhat smaller plant with prostrate summer leaves with curved-up margins. Often the plant is recognizable because of plantlets being developed at the leaf tips.

Flower scapes are 5 – 10 cm tall and the flower has 5 nearly same-sized pink lobes; the throat is yellowish. The spur is just a short bulge.

**Origin and habitats:** Southern USA on acid grounds.

**Temperatures:** Thrive well on window sills during the summer, but temperature may be too low in winter. Terrariums or wardian cases may be better suited.

**Light:** Semi-shade or shade. Easily grown under artificial lights.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat.

**Container:** Little or medium pots.

**Location:** Bright window sills without direct sunshine.

**Repotting:** Every second year during a period with quick growth.

**Annual behaviour:** This plant has periods of rest (or very slow growth) during the year; the set in of these periods seems to depend on temperatures. In growing periods the compost may be kept wet, e.g. the pot may be put in water reaching 3 cm below the compost surface. In resting periods the compost should kept only moist.

Flowering sets in frequently, apparently mostly when conditions are stable and rarely during transition periods between quick growth and rest.

**Propagation:** Plantlets may be loosened from leaf tips and potted.

**Prey capture:** Not impressive.

**Difficulties:** Somewhat whimsical.

### **Sarracenia flava**

**Description:** Leaves are 20 – 100 cm long, erect and shaped like tubes. They are widest at the top and on the rim a short wing-like 'lid' is found. The leaves are yellowish green with more or less distinct green or red markings and lines. The tubular part of a leaf may be divided into two zones according to the inner surfaces: An upper zone that is quite smooth ('sliding' zone) and the lower zone with long downward pointing hairs. A

little water is normally found at the bottom of the hollow leaves, and that is where the trapped animals succumb and disintegrate. The plant has a horizontally growing rootstock (rhizome) lying in the soil surface or just below. The flower scape is as tall as or a little taller than the leaves, and carries a single great flower being yellow (yellowish green or cream) and of a most peculiar appearance and structure.

Several varieties are named after their character, e.g. colouring of the leaves ("Green Form"), nature of markings on the leaves ("Veined", "Heavily Veined", "Red Veined") or colouring of the lid ("Copper Lid").

This species has been much used in hybridization.

**Origin and habitats:** North America from Virginia to Florida, mainly on coastal plains. Found in marshy places, often together with *Sphagnum* mosses.

**Temperatures:** The plant can endure frosts, and is said to be hardy in Denmark. Indoors it should be kept cool in winter and in bright light.

**Light:** Bright position, but the plants should be protected from direct midday sunshine during the summer. Outdoors the plants will endure full sun.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (3:1). Addition of some chopped living *Sphagnum* moss may be rewarding. The compost should be weakly acid.

**Container:** Pots 15 - 25 cm wide.

**Watering:** This species is sensitive to drying-out, so take care.

**Repotting:** Spring, as the growth is initiated.

**Annual behaviour:** Leaves wither in low temperatures. Flowers will appear in early summer.

When grown indoors for its decorative charms, the plant should be kept cool and as bright as possible during the winter, as this will keep the plants active and growing.

**Propagation:** Seeds are sown fresh, and if they have not germinated after 1½ - 2 months at 18 – 22 °C (64 – 72 °F), the pot may be put in the refrigerator for 4 – 6 weeks and then put back to germinate. This 'vernalization' may be repeated. Dried seeds may be stored in the refrigerator until spring.

Vegetative propagation: During repotting the rhizome may cut into pieces (each 3 cm long); the pieces are potted and kept at minimum 18 °C (64 °F).

Leaf cuttings (see *Drosera filiformis*) may be used and they should be cut so that each has a few roots (on a piece of the rhizome).

**Prey capture:** Nothing much on the window sill but outdoor the catch may be considerable, especially bigger insects as hoverflies, flies and hornets.

**Difficulties:** None, this species is easy to grow.

## **Sarracenia leucophylla**

### **Description:**

The erect tube shaped leaves are 40 – 100 cm long, on window sills generally less (30 - 50 cm). The lower part of pitchers is green, the upper part and lids are pure white and heavily laced with a network of veins in green, maroon or red; the netting may be finely pencilled or it may be broader. Usually two growths of pitchers appear, early summer (thin) and early autumn (robust). The tubular part of a leaf may be divided into two zones according to the inner surfaces: An upper zone that is quite smooth ('sliding' zone) and the lower zone with long downward pointing hairs. A little water is normally found at the bottom of the hollow leaves, and that is where the trapped animals succumb and disintegrate. The plant has a horizontally growing rootstock (rhizome) lying in the soil surface or just below. The flower scape is as tall as or a little taller than the leaves, and carries a single great flower being red with a scent of violets and of a most peculiar appearance and structure.

Several varieties are named after a location (Blackwater, Deer Park, Escambia, Mississippi, Milton, Mobile, Periodo, Santa Rosa, Tibbies, Walton, Yellow River) or the name reflects a character (Alba, Green and White, High Narrow Pitchers, Pubescent, Pubescent Pink, Rubra, Short Stocky Pitchers, Undulata, Yellow flower).

This species has been much used in hybridization.

**Origin and habitats:** This species is found in North America (Georgia, North Florida, Gulf Coast, and Alabama), in swampy meadows.

**Temperatures:** Keep the plants cool in winter, never below 8 °C (46 °F). May be placed outdoor the greater part of the year.

**Light:** See *Sarracenia flava* (above).

**Compost:** See *Sarracenia flava* (above).

**Container:** See *Sarracenia flava* (above).

**Location:** Window sills are ideal, preferably facing east, south or west. The species may be placed outdoors in summer.

**Watering:** The compost must be kept very damp during the whole growth season; in winter watering should be reduced, but kept constant.

**Repotting:** See *Sarracenia flava* (above).

**Annual behaviour:** Plants in greenhouses or on window sills may keep their leaves through the winter.

Mostly flowering takes place in spring or early summer.

**Propagation:** See *Sarracenia flava* (above).

**Prey capture:** See *Sarracenia flava* (above).

**Difficulties:** No difficulties, this species is easy to grow.

## **Sarracenia psittacina**

**Description:** The tubular leaves are 5 – 30 cm long and the terminal opening is narrowed down by a funnel shaped structure leaving only a narrow opening. The prostrate leaves are green at the base but the terminal parts have brown and reddish lines and net-like colourings with white spots, and the most terminal parts are brownish red. The greater part of the preys are aquatic animals (daphnia, mosquito larvae etc.) caught during submersed periods. The plant has a horizontally growing rootstock (rhizome) lying in the soil surface or just below. The single flower is red, pleasantly scented and has the peculiar *Sarracenia* appearance. As the leaves (10 – 30 cm long) are prostrate the whole plant is no more than 15 - 20 cm tall.

This species has been much used in hybridization.

**Origin and habitats:** Northern America (Georgia, Florida, Louisiana and Mississippi). This species is found in moist and marshy places, especially among scattered *Pinus* trees on poor soils and will often be submersed during rainy periods.

**Temperatures:** From 0 to 35 °C (32 – 95 °F), do not expose plant to frosts. The compost should never be allowed to dry out. Indoor winter temperatures should be low.

**Light:** Bright light with sunshine; in greenhouses some shade should be provided.

**Compost:** Preferably living *Sphagnum* moss mixed with some *Sphagnum* peat and 1/5 lime-free gravel.

**Container:** Pots 10 - 20 cm wide.

**Watering:** Keep the compost moist during the growing season (1 cm water bed). In winter the plant (pot and plant) may be completely covered by water (pH 5 – 6).

**Repotting:** Spring.

**Annual behaviour:** The leaves do not wither during winter. Flowering season is early summer.

**Propagation:** Dried seeds should be stored in the refrigerator. Germination is best at 18 – 22 °C (64 – 72 °F).

Vegetative propagation: See *Sarracenia flava*.

**Difficulties:** This species is tricky as the plant and compost tend to be overgrown by algae during submersed periods; experience as an aquarist will be beneficial. However, the species may be grown with very wet (winter) periods instead of submersion.

## **Sarracenia purpurea**

**Description:** Leaves are formed as tubular traps. The tubes are inflated but narrows down at the end where an erect and prominent 'lid' is found. The colour is green with brownish or reddish markings and lines; in sunny places the leaves may turn purple. The tubular part of a leaf may be divided into two zones according to the inner surfaces: An upper zone that is quite smooth ('sliding' zone) and the lower zone with long

downward pointing hairs. A little water is normally found at the bottom of the hollow leaves, and that is where the trapped animals succumb and disintegrate. The plant has a horizontally growing rootstock (rhizome) lying in the soil surface or just below. The single flower is purple or pink, strongly scented and has the peculiar *Sarracenia* appearance. The whole plant is 10 – 25 cm tall.

Varieties are named after their characters:

*S. purpurea purpurea* is the northern type, leaves relatively narrow and long, green or red in summer – brown in winter. It is found in very wet places, acid as well as alkaline.

*S. purpurea venosa* is the southern type (from New Jersey to Louisiana) with shorter and inflated leaves. This species has been much used in hybridization.

**Origin and habitats:** North America from Georgia to Mississippi and along the Atlantic coast from Labrador to Florida. Marshy places. The species has been naturalized several places in Europe.

**Temperatures:** This species endures frosts, and may be hardy in Denmark. Indoors the plants should be kept cold during winters and given as much light as possible. Summer temperatures exceeding 35 °C (95 °F) are harmful.

**Light:** Bright position, but some protection should be provided against midday sunshine (sills facing south and in greenhouses).

**Compost:** Finely crumbled non-enriched *Sphagnum* peat and lime-free gravel (3:1). Living *Sphagnum* moss or some topsoil may be added. The compost should be weakly acid.

**Container:** Pots 10 - 20 cm wide.

**Repotting:** Every second year in the spring.

**Annual behaviour:** In the nature very low winter temperatures may destroy the leaves. The growth period is from April to September-October, the flowering period is early summer.

**Propagation:** Seeds are sown fresh and if they are not germinated after 1½ - 2 months at 18 – 22 °C (64 – 72 °F), the pot may be put in the refrigerator for 4 – 6 weeks and then put back to germinate. This 'vernalization' may be repeated. Dried seeds may be stored in the refrigerator until spring (2 – 3 months in refrigerator may enhance germination).

Vegetative propagation: During repotting the rhizome may be cut into pieces (each 3 cm long); the pieces are potted and kept at 18 - 20 °C (64 – 68 °F).

Leaf cuttings (see *Drosera filiformis*) may be used: They should be cut so that each has a few roots (on a piece of the rhizome).

**Prey capture:** As *Sarracenia flava*.

**Difficulties:** None, this species is easy to grow.



## **Utricularia alpina**

**Description:** Underground stems have tubers and bladders. The tubers (1 – 2 cm) store nutrition and water, and they have a yellowish milky appearance; if they are situated in the surface and exposed to light they turn green (probably performing photosynthesis). The traps are bladders (modified leaves) barely 0.1 cm in size, and their sensible hairs are triggers that upon being touched release a suction effect that bring the tiny prey inside the bladder where digestion takes place. The preys are microscopic animals living in the soil. The leaves are somewhat fleshy, 3 – 6 (15) cm long and about 1½ - 2 cm broad.

Flower scapes are 5 – 30 cm tall and each carry one to four big (2 – 3 cm) white flowers with a yellow spot and a spur; the showy flowers have a certain resemblance to some orchid flowers.

Varieties: Big flower, Red form, Red type, Henry Pittier.

**Origin and habitats:** West Indies and Central and South America. It is an epiphyte growing in mosses on tree trunks in moist woods.

**Temperatures:** This species should be kept at 16 – 30 °C (61 – 86 °F) in summer and at 6 – 18 °C (43 – 64 °F) in winter.

**Light:** Semi-shade.

**Compost:** Finely crumbled non-enriched *Sphagnum* peat with some lime-free gravel. Chips of bark, charcoal or some leca may be added.

**Container:** Pots 10 - 15 cm wide and preferably with large holes in the sides. Baskets made of plastic, metal web or wooden lists – as some orchid growers use them – may be used but they are not suitable on window sills.

**Watering:** During the growing season the compost must never be allowed to dry out. During winter the compost should be only moderately moist.

**Location:** Bright window sills without direct sunshine.

**Repotting:** Results of repottings are rarely appropriate or good-looking mainly because the leaves as well as the underground stems are brittle and fragile. Instead you could cut the old lump into big pieces and pot them separately.

**Annual behaviour:** Low temperatures may slow down the growth which is beneficial in winter. Several leaves usually wither during the dark winters. Flowering is promoted by lower temperatures and less moisture in winter.

**Propagation:** Seed propagation is difficult and slow.

Vegetative propagation: See Repotting (above).

Note: The tubers have no 'eyes' as potatoes do and therefore they cannot be used in propagation.

**Difficulties:** This species is easy to grow – especially if the humidity is not too low. Flowering may fail if the temperature is high and high throughout the year.

## **Utricularia gibba**

**Description:** This is an aquatic (or amphibious) plant that resembles a tuft of coarse green algae. However, if you are in doubt, look for the small bladder traps.

The branching stolons are thin (0.02 cm), may reach 15 cm in length, and each leaf consists of a couple of narrow thread-like lobes with 2 – 5 minute side lobes. These parts of the leaf are hardly visible with unaided eyes. At the base of one of the leaf lobes you find a bladder – a most surprising structure functioning as a trap for microscopic aquatic animals (ciliates, etc.). The bladder traps are about 0.01 cm.

The plant grows numerous branches and forms a lettuce green tuft or mat hanging just under the water surface. In the past *U. gibba* was a well known aquarium plant used as spawning substrate for a number of fish species.

Each flower scape holds 1 – 5 flowers 5 – 10 cm above water level; the flowers (0.25 – 1 cm) are yellow or rarely pale yellow. The flower has an upper and a lower lip; the upper one is nearly circular, the lower has a bilobed swelling in the centre.

**Origin and habitats:** This species is reported from the Americas, Australia, Tasmania and New Zealand, and *Utricularia gibba* var. *exoleta* (*U. exoleta*) is reported from Europe, Africa, Asia and Japan. The distinction between these forms is rather uncertain.

Habitats are shallow water in ditches, pools, bogs and swamps that are still or very slow flowing. The water is (weakly) acidic and low in nutrients.

**Temperatures:** Summer: 15 – 30 °C (60 – 86 °F) and night temperatures somewhat below day temperatures may be beneficial. Winter 5 – 14 °C (41 – 57 °F).

Some forms are said to survive freezing of the water; if you want to try, let temperatures drop slowly during a month or so.

**Growing the species:** Grow the plants in small containers (20 x 20 x 10 cm) with shallow water, 5 - 10 cm deep:

- 1) Water should be soft and preferably naturalized (i.e. from an established aquarium or partly from a suitable natural source).
- 2) No violent water movement; aeration is not necessary.
- 3) No plant eating fishes and (as far as possible) no snails.
- 4) Other plants will be OK if they don't decrease the light intensity too much.

Place the containers on a bright window sill and keep 15 – 25 °C (59 – 77 °F). If the floating miniature fern *Salvinia* is thriving, the light intensity will suit *U. gibba*. At low light intensities *U. gibba* will grow elongated stolons, i.e. greater distances between the leaves, and with fewer branches.

If algae grow very well – get rid of them at regular intervals (move *Utricularia* and water to a new container and clean the old one).

**Flowering the species:** In spring or early summer establish a sloping substrate surface in a suitable container. The substrate could be equal parts non-enriched *Sphagnum* peat and lime-free gravel or river

sand and should be 2 – 4 cm deep. Add water to a level allowing about half of the surface to be above water level. Place a tuft of *U. gibba* so that half of it is in the water, the other half lying on the waterlogged substrate. Place the container where light and temperature is suitable.

This arrangement will boost the growth of *U. gibba*, and often flowers will come out after two months.

**Annual behaviour:** The species may overwinter as somewhat reduced green tufts, or in temperate conditions (below 6 – 8 °C; 43 – 46 °F) as hibernaculums (turions) - just as other temperate aquatic species in the *Utricularia* genus. The hibernaculums are sinking and spend the cold season at the bottom of the pond / container. Flowering season is early to late summer.

If artificial lights are used (and suitable temperatures are maintained), this species may be kept growing and flowering all year round.

**Propagation:** Pollination of the flowers is a haggling thing: Gently tear upper and lower lip from each other and remove both before transferring pollen from one flower (scape) to another.

Vegetative propagation: Tear a plant tuft into smaller pieces.

**Difficulties:** No, this species is easy to grow.

### **Utricularia livida**

**Description:** In vegetative characters this species closely resembles *U. sandersonii* (below).

The flowers are white with a little yellow in the throat. In bright light the flowers are greyish purple (*livida* means lead-coloured, bluish grey). The flowers come out successively and the scape may grow to 18 cm.

The scape carries 5 – 10 long-lasting flowers and the plant has flowers the greater part of the year.

Varieties: White flower; Big leaf; Small leaf.

**Origin and habitats:** South Africa. A terrestrial plant found in moist and shaded spots.

**Temperatures:** The plant should be kept at 17 – 36 °C (63 – 97 °F) in summer and at 9 – 21 °C (48 – 70 °F) in winter.

**Propagation:** The plant seems to be self-sterile, but vegetative propagation is not a problem: simple cut the compost lump into pieces and pot. This operation can be carried out at any season except in dark winters.

**Difficulties:** No, this species is easy to grow.

See: *Utricularia sandersonii* (below)

## **Utricularia sandersonii**

**Description:** A dwarf plant with threadlike stems that grow in the soil surface. The leaves are 0.3 – 0.6 cm long and rounded spatula shaped. The stems carry the bladders that are leaves modified into traps; they have sensible hairs that upon being touched trigger a suction effect that bring the tiny prey inside the bladder where digestion takes place. The preys are microscopic animals living in the soil.

The delicate flower scapes grow to 10 cm and carries 1 – 10 very long-lasting flowers. The pale purple or pale pink flowers have a long forwardly curved spur; the size is about 0.5 cm.

More than one variety may be found in culture:

- The stems of *U. sandersonii* 'Chr' is almost entirely subterranean and the flower stems has each 5 – 8 flowers.
- *U. sandersonii* 'Michael' has many stems above the surface and short flower scapes each carrying only a single flower that lasts for 2 months at least.
- Narrow flower form.
- White flower form.

**Origin and habitats:** South Africa. A terrestrial plant found in moist and shaded spots.

**Temperatures:** This species should be kept at 16 – 30 °C (61 – 86 °F) in summer and at 6 – 18 °C (43 – 64 °F) in winter. Might be placed outdoor in the summer.

**Light:** Semi-shade. May be grown under artificial light (in summer 5,000 – 10,000 Lux and 1,000 – 3,000 Lux in winter).

**Compost:** Finely crumbled non-enriched *Sphagnum* peat with some lime-free gravel. Chips of bark or some leca may be added. The compost should be acid (pH 4.5 – 6).

**Container:** Pots 5 - 12 cm wide.

**Location:** Bright window sills, be sure to protect against direct sunshine in summer.

**Repotting:** Instead of repotting – use vegetative propagation (see below).

**Annual behaviour:** In dark winters it may be beneficial to slower the growth by lowering the temperature, but the plants may be kept growing throughout the year.

**Propagation:** The species has self-sterile and self-fertile types.

Vegetative propagation is no problem: Simply cut the compost lump into pieces and pot. This operation can be carried out at any season except in dark winters.

**Difficulties:** No, this species is easy to grow.

**Converting cm to inches**

<b>cm</b>	1	3	5	12	15	20	35	40	100	2,000
<b>Inches</b>	0.4	1.2	2.0	4.7	5.9	7.9	13.8	15.7	39.4	787.4

**Converting Lux to Foot-candles**

<b>Lux</b>	1,000	3,000	5,000	10,000	12,000
<b>Fc</b>	93	280	465	930	1,115

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