

Cultivation recommendations for the strapwort – ex situ conservation cultivation

I. Obtaining plant material to secure natural populations

1. In order to conduct conservation cultivation, seeds of the strapwort should be obtained from natural sites within the Task area.
2. Fruits containing single seeds begin to ripen at the end of summer and fall in late autumn. Seeds should be collected in the second half of September or in October, taking into account modifying factors (weather conditions in a given year have a strong impact – the early occurrence of higher spring and summer temperatures and a faster drop in the water level in the river accelerates the development of the strapwort, while prolonged cold delays its development).
3. The greatest possible number of seeds should be collected from as many specimens and sites as possible, with no more than 5-10% of the available seeds collected at each sites (e.g. collecting seeds from half of the inflorescence on every 5th stems of the plant or from the whole inflorescence on every 10th stem) to avoid adverse impact on populations and prospects for its continued existence.¹
4. In the case of plants and habitats directly threatened by destruction (in conflict with the project), all available seeds from plants that would be destroyed should be obtained.

II. Seed preparation and storage

1. Collected seeds should be ripe and full, i.e. hard-shelled (fruit with soft seeds or empty ones should be discarded).
2. Seeds should not be collected after rain.
3. If seeds become moist for any reason, they should be dried immediately after collecting, i.e. placed in a ventilated place, on paper, at a temperature not higher than room temperature.
4. Collected seeds should be inspected and those with signs of fungal diseases or pests, or deformed ones, should be discarded. The remaining ones should be cleaned, with any remnants of the flower receptacle or calyx removed (the ripe ones should peel off after

¹ In one inflorescence, on average, approx. 6 fruits with one seed develop (on the whole plant there are from 15 to 60 of these, on average 30). Populations in Poland may set fewer seeds, so the numbers given may be lower for Polish conditions. The seeds have hard shells, three sides, and are less than 1 mm long. They are surrounded by a cup-like flower receptacle and a solid calyx – the whole fruit is 1 to 2 mm long.

drying as the seeds are rubbed), treated with a fungicidal preparation, and placed in a container (e.g. glass jar or plastic bags), mixed with a small amount of sand, and then put in a fridge, but not cooled below 2-3°C. Dividing the seeds into several portions stored separately is recommended (in case a fungal disease or another pathogen develops). If there is a large number of seeds, some of them can be sown at the target site immediately after collecting.

5. Sowing should be carried out no earlier than in mid-March (also taking into account weather conditions), however, with appropriate seed stock and capabilities, sowing batches of seeds at intervals until April is recommended.
6. Before sowing, it is recommended to soak (at least some of) the seeds in soft water at room temperature for several hours, up to one day (and then, to facilitate sowing, they can be spread on tissue paper or another type of paper to dry out).
7. Before sowing, treating the seeds with fungicide is recommended (in accordance with the instructions provided).
8. If the seed stock allows for it, sowing some of the seeds directly into the soil, and some in high pots for seedlings (minimum 7 cm) is recommended.
9. Seeds should not be sown too deep (should be barely covered with soil, as seeds placed deeper do not germinate).
10. The soil must be highly permeable, mineral, but relatively rich in nitrogen compounds. Compost soil mixed with sand can be used. The soil should be kept moist, but its moisture content cannot be greater than 85%. Water must not stagnate at the place of cultivation. Over-drying should be avoided in the case of young plants, as the seeds do not germinate in dry soil.

III. Cultivation

Strapwort can be successfully cultivated on flower beds in garden conditions. The key is:

- a) providing a permeable soil with a large proportion of mineral fraction (sand, gravel). The layer of permeable soil should be at least 15-20 cm thick, but it would be best if it were on clay soil (to help maintain adequate humidity). The optimal acidity is close to neutral.
- b) The soil should be fertile – admixture of compost soil is recommended, adding nitrogen fertilizer is also possible.
- c) A well-lit site is necessary.
- d) Elimination of competitive species, especially growing ones and ones higher than a few cm – strapwort reacts badly to competition with other plants. Small (up to 4-5 cm tall) and non-expansive accompanying plants are, however, advisable for protection against wind, spreading small stones between plants may also be advisable for this purpose.
- e) The soil should be moist, but water must not stagnate at the place of cultivation. Older plants tolerate periodic drought well.
- f) Replanting should be conducted as carefully as possible – moving the plant along with the entire lump of soil. Plants which have grown a little should be replanted – ones with a well-developed leaf rosette. When planting plants from seedlings, they should be placed no closer than 15-20 cm apart (shoots are usually around 10-30 cm long).
- g) As many seeds as possible should be obtained from cultivated plants (if the cultivation is continued in the same place, some may be left on the plants).

IV. Performance monitoring

1. In summer, the period of the full development and flowering of the strapwort, an inventory of its sites and resources in a given year should be conducted. Due to the biology and ecology of the species (an annual plant whose seeds are spread by river waters, occupying dynamic silt habitats) its previously registered sites are only an indication of where in particular it should be looked for. However, all silts in the riverbed on the section covered by works require control – the plant appears in different places and variable quantities in different years.