

A protocol for growing Tufted Sedge *Carex elata* from seed

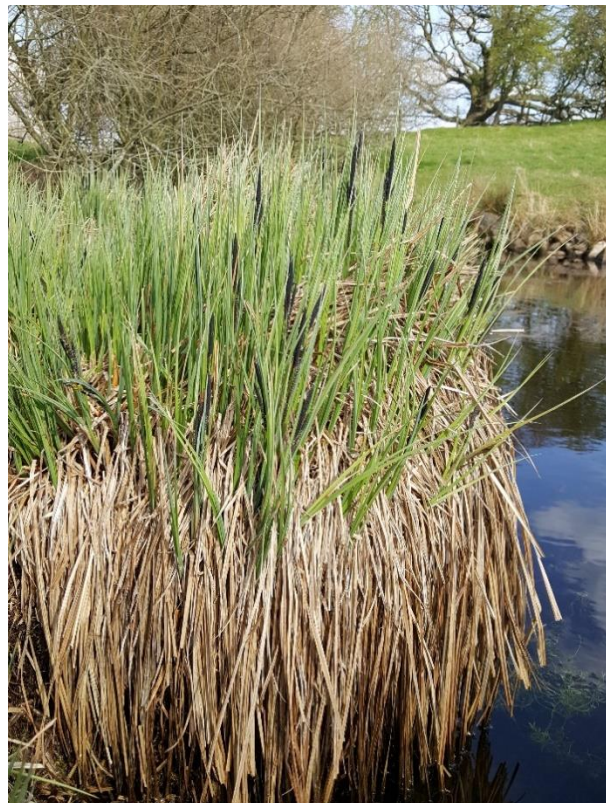
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Tufted Sedge *Carex elata* is tussock-forming sedge which is an important constituent of fen and fen carr. It has a localised distribution in Britain, concentrated in historic wetland landscapes. This species is typically found in long-established wetlands with base-rich water, growing on pond and ditch banks or in seasonal pool systems. In North Yorkshire it's often associated with kettle hole pools (photos below) and gypsum dubs (natural subsidence ponds).



Tufted Sedge can form monodominant stands of tussocks (*Carex elata* swamp, coded S1 in the National Vegetation Classification) but occurs also in more species-rich reedfen and in fen Alder carr (NVC W6). The large tussocks provide refugia for terrestrial invertebrates when water levels rise but also humid habitats for semi-aquatic species during dry phases.



Tufted Sedge is known as *Carex stricta* in North America, where it has been described as a “restoration super-plant” due to its ability to sequester carbon and nutrients and its role in the vegetation structure of wetlands.

At the Lower Ure Conservation Trust's experimental fen creation site, Flasks Fen, Tufted Sedge is one of the most successful species we've planted. In a fenced trial transect where individual plants were monitored for four years, this species showed a 95% survival rate with plants flowering within two years. Flasks Fen is located on the silt shore of a lake created by sand and gravel extraction at Tarmac's Nosterfield Quarry near Ripon in North Yorkshire. The lake is moderately eutrophic with base-rich water (pH around 8) influenced by the surrounding magnesian

limestone. The site is infested with invasive *Crassula helmsii*, which can smother small herbs but appears to have no effect on Tufted Sedge introduced as pot-grown plants.

Tufted Sedge can be propagated vegetatively but this method produces clones with limited genetic diversity, and with care this is one of the easier sedges to grow from seed. The protocol below is based on our experience since 2018.



Tufted Sedge at Flasks Fen, where it's been planted extensively around the limit of winter flooding.

Protocol

Tufted Sedge is one of the easiest *Carex* species to grow from seed but only when sown very fresh. Timing of seed collection is critical as utricles (fruits) fall from the female inflorescence as soon as they ripen. Moreover, populations flower at roughly the same time, so there is only a narrow time window for collecting from a site. In North Yorkshire, the optimum time for collecting seed from wild populations is between the middle of May and early June. As soon as seed falls when the seedhead is touched, it is ready to collect and sow.

If you have stock plants, or easily accessible wild donor plants, small bags of paper or fine-meshed cotton can be placed over ripening inflorescences to ensure that seed isn't lost. However, remember that sedges are wind-pollinated so leave time for this. If you have stock plants inside, fallen seed can be collected from sheets of paper placed beneath the plants.

Sow whole utricles as soon as they've been collected. Treatment such as cold storage or scarification is **not** necessary. Sow onto the surface of damp peat-free compost (either a general purpose or seedling formulation will do). Keep permanently moist and do not allow to dry out, but do not immerse.

Keep the seed tray in natural light in an unheated environment (we use a polytunnel).

The seed coat turns brown as it dries and splits tip to base. Germination is fairly rapid, often occurring in between a week and a fortnight.

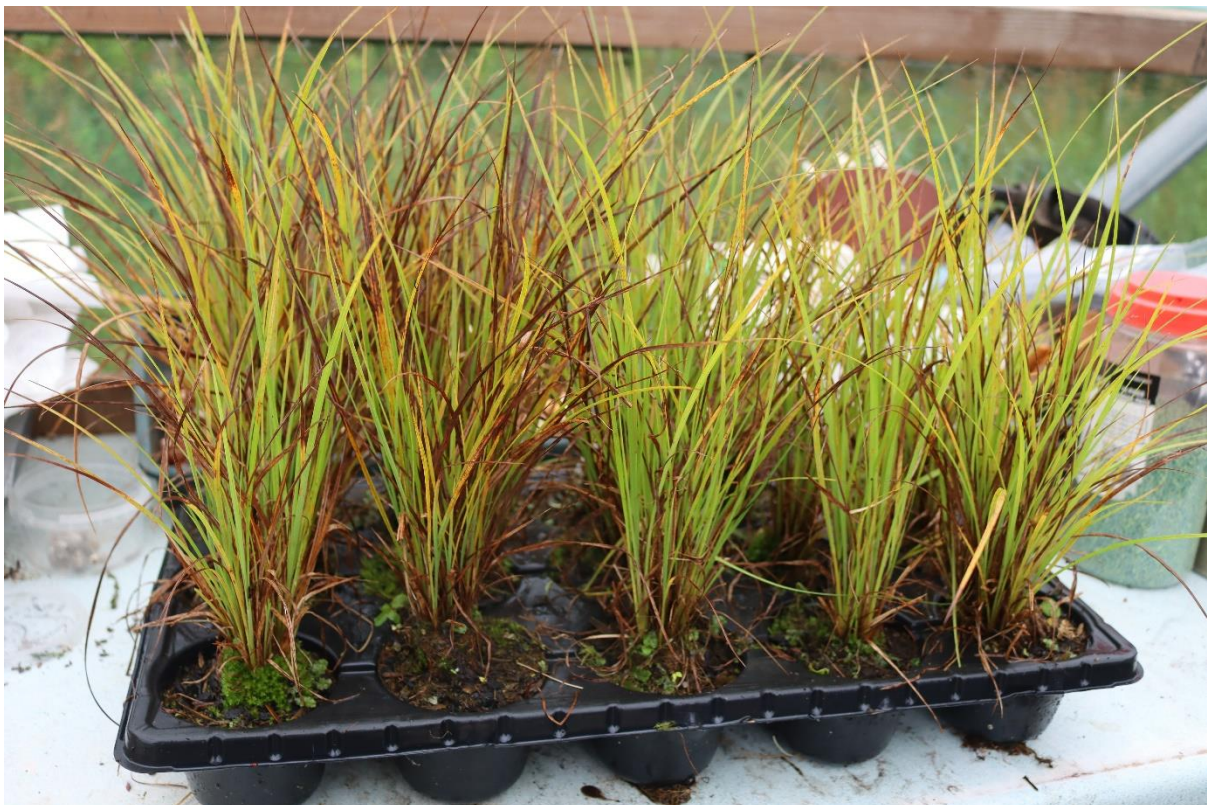
Seedlings can be pricked out into 3 cm diameter plug trays, then subsequently into 8 or 9 cm pots or large plug trays. We grow-on in an unheated polytunnel.

Compost should never be allowed to dry out: we use a capillary matting system to ensure a continuous moisture supply. Controlled release fertiliser is added to pots and larger plugs with a 50/50 mix of 3 month and 12 month formulations; roughly 5 or 6 pellets are added to a 9 cm plug, twice that amount to a 1 litre pot.

Tufted Sedge plants can be ready for planting-out in around 6 months from sowing, when a sturdy rootball has established. Although this is a robust plant once established, it needs to be protected from grazing animals initially. Our planting trials are protected by re-useable steel mesh fencing but established plants seem to be avoided by rabbits.

At Flasks Fen, this species has established well across a broad hydrological gradient, in locations with summer water levels of around +30 cm to – 20 cm. Tussock formation is better in wetter situations.

In our trial plots, Tufted Sedge remains vigorous in tall reedfen as well as in open vegetation. However, there are reports from elsewhere of plants being suppressed by reedmace (*Typha* species) and Reed Canary-grass (*Phalaris arundinacea*).



Tufted Sedge plants in large plug tray, ready for planting out



Tufted Sedge plant in 1 litre pot, ready for planting out

Headstarting tussocks

We adapted a method developed by the University of Wisconsin Arboretum to promote tussock-formation in Tufted Sedge (see Further Reading, below). Essentially, the pedestal of the tussock is formed by vertical growth of rhizome in response to fluctuating water levels. Immersing young plants and exposing them to fluctuating water levels stimulates this process. While we haven't quantified results, this has been effective in accelerating tussock development in our trials. A US study has reported +18 cm water depth during the growing season as optimal for tussock formation.

During the growing season, we immerse pot-grown plants in a tank, with the water level well above the pot for about a month. The water level is then dropped to below the pot for a month and this cycle repeated three times between April and September.

Further reading

Tussock Sedge – a restoration superplant?

https://arboretum.wisc.edu/content/uploads/2015/04/22_ArbLeaflet.pdf

Beth Lawrence & Joy Zedler. (2011). Formation of tussocks by sedges: effects of hydroperiod and nutrients. *Ecological Applications*, **21**. Pages 1745-59.

Beth Lawrence & Joy Zedler. (2013). Carbon storage by *Carex stricta* tussocks: a restorable ecosystem service? *Wetlands*, **33**. Pages 483-493.

Michelle Peach & Joy Zedler (2006). How tussocks structure sedge meadow vegetation. *Wetlands* **26**. Pages 322–335.

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