

Optimization of nettle (*Urtica dioica*) seedling production

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A growing interest

Stinging nettle (*Urtica dioica*) is a perennial, low input plant that has many applications due to its nutritional properties and bioactive compounds (**food, feed, medicine, cosmetics**) but also fibres (**textile, biocomposites**). The interest in nettle as an **alternative crop** is growing in Europe.

Previous research showed that planting seedling is the most efficient way to establish fields. Here are summarized the results of the project "**Arctic nettle, from weed to money**" (**ARKNOKK**) regarding conditions for seedling production in Northern Finland.

Seeds

Nettle seeds are small (1.0x1.5mm). They are surrounded by small leaves and should be sorted for seeding (**Fig. 1**).

The average weight of one seed was 0.13mg (Rovaniemi seed origin, 2022). So 1g of sorted seeds contains more than 7000 seeds.



Figure 1. Sorted (left) and unsorted (right) nettle seeds

Seeds up to 4 year-old (2019 -> 2022) showed similar germination rates (storage in paper bags at room temperature).



Figure 2. Nettle seedlings in a tray filled with substrate #3 (left) and #2 (right) 25d after seeding.

Substrate

Seeds (ca. 5-7/cell) were planted in plantek PL 121 trays filled with 5 different commercial substrates (**Table 1**). Detailed composition of the substrates can be found at www.biolan.fi or www.kekkila.fi Seeding was done in late May in a greenhouse with natural light.

Table 1. Substrates tested for seed germination and early growth.

#	Substrate	Density (g/l)	NPK (mg/kg DW)	pH
1	Biolan Puutahran musta multa	500	450-270-1800	6.5
2	Biolan Turvemulta	300	1300-840-4200	6.0
3	Kekkilä Kylvö ja taimimulta	490	220-180-240	6.5
4	Biolan Kylvö ja taimimulta	400	420-300-1680-	6.2
5	Biolan Yrttimulta	360	470-430-4600	6.5

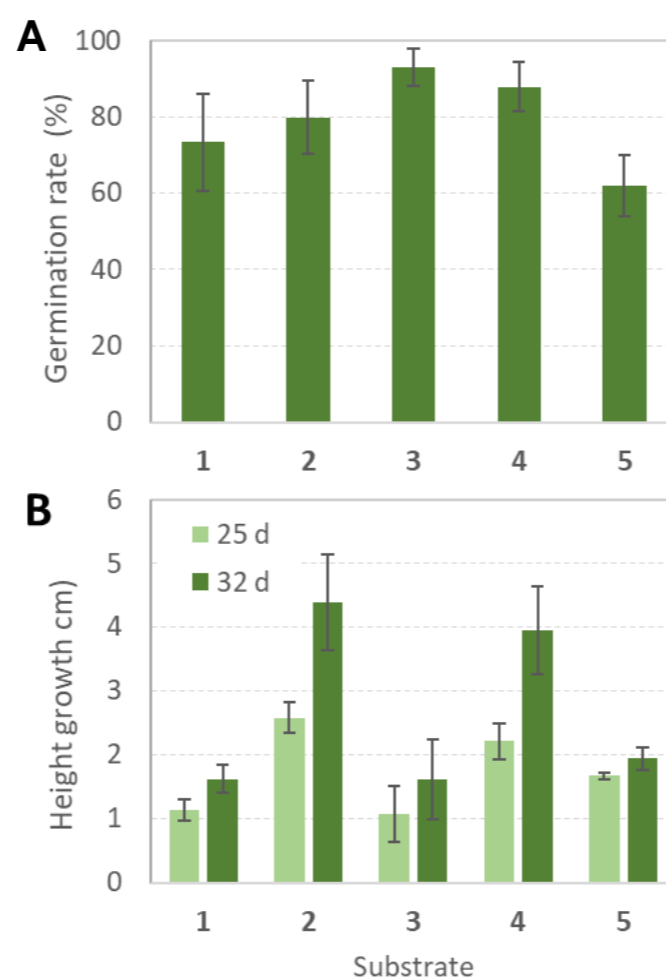


Figure 3. Effect of substrate on seed germination (**A**) and early growth (**B**) of nettle seedlings. Values are means \pm SE (n=3).

Measurement of germination rates and early growth 3 and 4 weeks after seeding showed that substrate **#2: Turvemulta, Biolan** gave the best results (**Figs. 2, 3**). It is a peat-based substrate, with a low density and rich in nutrients (**Table 1**).

Low density, peat-based substrate is recommended
Nettle seeds germinated best with a minimum of 4h night

Photoperiod

Seeds were sown in peat pots filled with Turvemulta, Biolan (80-100 seeds/pot) and exposed to plant LED lights (135W, LedFinland Oy) for 0, 12, 8, (4+4), 4 or 0 h night. The substrate was maintained moist. Seeding done indoor under natural light in late May served as a positive control.

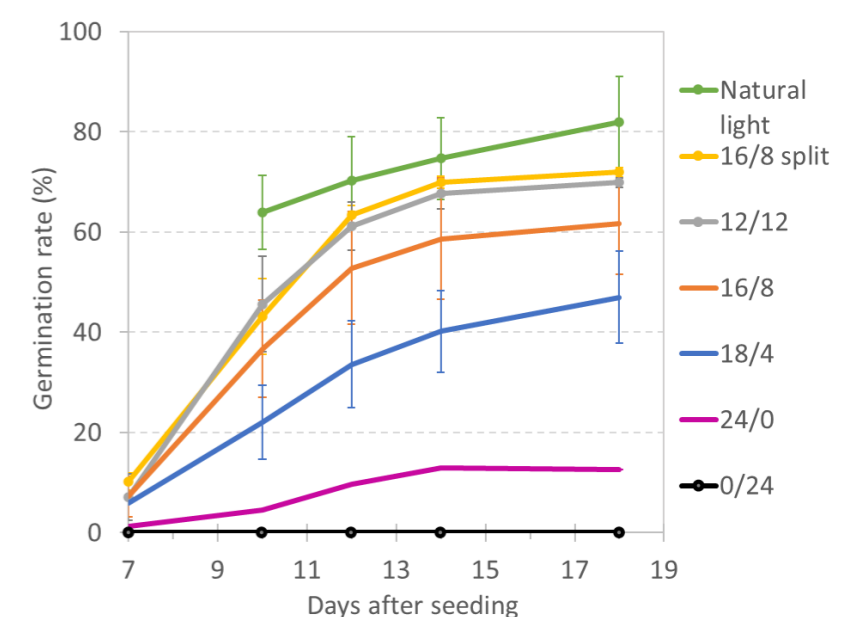


Figure 4. Effect of the photoperiod on seed germination rate (values are means \pm SE, n=3).

Results showed that seeds need **light**, but also **dark** for germination (**Fig. 4**). A minimum of 4 h dark is recommended, but **12h dark** appears as good conditions to also limit energy costs when using artificial light. Maximum germination rates were reached after 2 weeks.

Good germination rates were obtained in May in a non-heated greenhouse in Lappia, Loue (**Fig. 5**).



Figure 5. Nettle seedlings cultivated in trays in Lappia, Loue.



Best periods for seeding in natural light in northern Finland is April-May, or after mid-July (nighttime >4h)