



PRACTICE ABSTRACT No. 16

Soybean chilling stress

PROBLEMS:

- Chilling stress can damage seeds which can ultimately result in death.
- Chilling stress affects early sown soybeans, when the seeds imbibe water under cold conditions (4 – 10°C).
- Early sowing of soybeans has other associated risks e.g. induced dormancy and plant damage from late frosts.
- Fluctuations in regional climatic conditions have major impacts on soybean yield. For example, in Romania the cold weather in March 2018 killed all winter and spring legumes, whereas in 2019 soybean volunteers in a winter wheat crop at NARDI Fundulea (Fig. 1) survived due to a dry and mild winter.



Fig. 1: NARDI Fundulea Organic Research Center – Volunteer soybean plants in winter wheat, 2019.

SOLUTIONS:

- Early sowing of soybeans can help deliver higher yields.
- The wide range of available soybean cultivars may have different levels of tolerance to cold soil temperatures.

PRACTICAL RECOMMENDATIONS:

- Evaluation of variation in soybean cultivar tolerance to chilling stress (Fig. 2) by cold germination test (6°C).
- Selection of soybean cultivars suited to cold soil conditions together with consideration of other traits, e.g. maturity group, time of flowering and maturity, adaptability to local climate and soil characteristics etc.



Fig. 2: NARDI Fundulea Organic Research Center – Soybean cold test (6 C°), 2019

➤ Sowing of soybean according to local forecast of air temperature, rainfall, soil conditions, etc. and adapt planting date, seed inoculation, seed rate, sowing depth, row spacing etc. accordingly.

FURTHER INFORMATION:

Alsajri FA, Singh B, Wijewardana C, Irby JT, Gao W, Reddy KR (2019). Evaluating soybean cultivars for low- and high-temperature tolerance during the seedling growth stage. *Agronomy* 9: 13. DOI: [10.3390/agronomy9010013](https://doi.org/10.3390/agronomy9010013)

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Mourtzinis S, Specht JE, Conley SP (2019). Defining optimal soybean sowing dates across the US. *Sci Rep* 9: 2800. DOI: [10.1038/s41598-019-38971-3](https://doi.org/10.1038/s41598-019-38971-3)

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ECOBREED CONSORTIUM



ABOUT ECOBREED:

ECOBREED is a 5-year (2018-2023) project funded by European Union's Horizon 2020 research and innovation programme that will improve the availability of varieties and seed suitable for organic and low-input production. Activities will focus on four crop species i.e. wheat, potato, soybean and common buckwheat, selected for their potential contribution to increasing the competitiveness of the organic sector.

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