



## AGROFORESTRY SYSTEMS:

### SILVOARABLE

Year of foundation	1922
Specialization	Crop and livestock production, wine growing and production, practical training of students
Farm area	2,533 ha (2,531 ha farmland, 1 ha forest)
Number of employees	113
Year of starting agroforestry practices	2019
Location	Zemědělská 53, 664 63, Žabčice
Year of foundation	<a href="http://www.szp.mendelu.cz">www.szp.mendelu.cz</a>

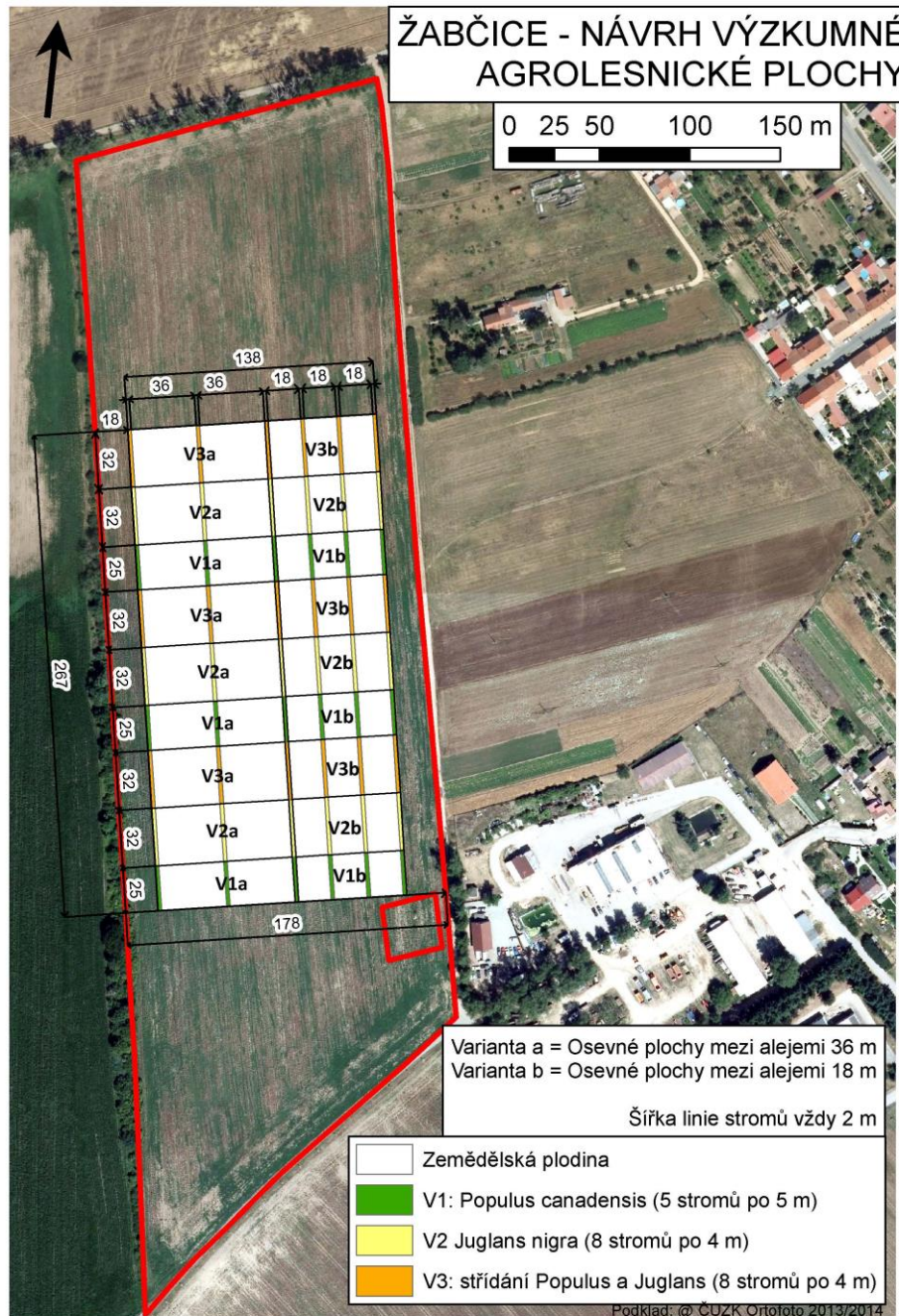
University agricultural enterprise Žabčice (ŠZP) is situated in Dyje-Svratka valley with highly fertile soils. The fields are mostly flat with an average altitude of 185 m a.s.l. However, the climate in the area of Žabčice is not favorable for agricultural production - the farm is situated in the South Moravian dry area with a typical inland climate with average annual precipitation of 380-550 mm and an average annual temperature of 10°C. The dryness of the climate is increased by winds, which cause a large evaporation of soil moisture. Rain shade also affects this area and, moreover, the precipitation is very uneven in the growing season.

**Wheat, barley, poppy seed, maize, alfalfa and wine are the main cultivated crops in the ŠZP and there is also a forest on its land. In the autumn of 2019, the first agroforestry area was established in the territory of the ŠLP - alley cropping system with black walnut and poplar.**





University agricultural enterprise Žabčice (ŠZP) is a part of Mendel University in Brno (MENDELU) and its basic mission is to ensure the agricultural and research activities of the University. **Purpose of the enterprise includes practical student training, providing scientific research activities of students in developing their final theses, as well as research, development, demonstration and consulting activities of academic staff of the University. Another important activity of ŠLP Žabčice is agricultural production.** In autumn 2019, a permanent agroforestry research plot for long-term monitoring was established on the field of ŠZP.



- Research on the agroforestry plot assumes a comprehensive monitoring of the relationships of the woody-agricultural crop-soil-climate system.
- Establishing an agroforestry area is expected to bring effective measures in the landscape against drought and wind erosion, improve soil conditions, while decrease risks in production economics.

The combination of tree species black walnut and poplar (*Juglans nigra* and *Populus canadensis*) and agricultural crops (wheat, barley, alfalfa) can be considered as a proven system in southern France (Restinçières) and generally at the borders of the temperate and Mediterranean climatic zones. The proposed experimental design is based on those experiences and natural conditions of the area of interest with regard to predicted climate change scenarios. Researchers from MENDELU and The Silva Tarouca Research Institute for Landscape and Ornamental Gardening (RILOG) participated in the establishment of the system.

ŠZP Žabčice function as a facility of MENDELU for research tasks in the field of agriculture. The faculties of MENDELU and RILOG guarantee professional background in the area of (special) tree care and soil and crop management. The agroforestry research plot will be in the permanent operational and financial support within the special-purpose activities of the ŠZP. The research part will be primarily supported from national and European project and grant sources. Planting and sowing, as well as subsequent tree management, are under the supervision of MENDELU and RILOG.

## DESCRIPTION OF USED TECHNIQUES DURING ESTABLISHING OF AGROFORESTRY SYSTEMS

The research plot consists of three repetitions of sub-plots with species and spacing variation: walnut (8 trees in distance of 4 m), poplar (5 trees in distance of 5 m), and alternating walnut and poplar (8 trees in distance of 4 m). Also the alley spacing is in two variants: 18 and 36 m. Walnut was established by direct sowing, Poplar from this year's cuttings. Planting/sowing took place in November 2019. Lines of trees will be grassed down and shrubs (*Ligustrum vulgare*) are expected to grow there. The agroforestry plot (approx. 5 ha) will always be compared with the control plot, the conventional agricultural system (always with the same crop of the same area). Altogether, the experiment will take place on about 10 ha.



## THREATS/CHALLENGES

- The most serious problem in tree planting in this area are climatic conditions and also heavy-textured soils.
- This area is **long-termly stressed by drought**, so it is necessary to combine a suitable tree species composition there, optimize the selection of planting stock, appropriate soil preparation, planting/sowing technology and subsequent care of trees.

# CONCLUSION

The research area will be one of the few research examples of the alley cropping system in the Czech Republic. Monitoring is planned for at least 30 years. **The area will be the object of complex ecophysiological, pedological, bioclimatological and landscape research and will be tested as a measure against drought and wind erosion. Production and economic parameters of agroforestry management will also be monitored.**



## FUTURE PLANS

The area will serve as a permanent demonstration and research plot, where long-term, broad-based surveys will be conducted. It is expected that the area will be involved in MENDELU's research tasks, teaching, elaboration of student works and organization of excursions. Thanks to the currently established area on forest land (a walnut and poplar plantation) it will be possible to compare the profitability of agroforestry and forestry system. It is expected that other areas of this type will be established on the territory of the ŠZP.

## FINAL RECOMMENDATION

The involvement of researchers as well as media to the establishing of agroforestry systems leads to greater publicity of the importance of agroforestry in our landscape.

## KEY WORDS

Crop production, tree planting, sowing, arable land, newly established research area, alley cropping



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