

## HAFL Master's Thesis Abstract

Year: 2021

Student's Name: Theres Rutz

English Title: **Plant communities in Swiss rice paddy agroecosystems**

**English Summary:** The cultivation method of paddy rice was introduced in Switzerland only recently with the intention of restoring wet arable cropland. Consequently, little is known about this agroecosystem and its potential in providing suitable temporary wetland habitats for biodiversity. The aim of this study was to provide information on plant community composition and the occurrence of particularly threatened species, especially wetland specialists. Repeated vegetation surveys were conducted in twelve rice paddies on the Swiss Plateau and in the Lower Valais, in order to assess the influence of rice paddy characteristics and agricultural managements on plant community composition. A total of 78 plant species was found in rice paddies, whereas overall species richness in paddy field edges was 195. Several red-listed species were found, including some highly endangered, such as *Lythrum hyssopifolia* L. and vulnerable species, such as *Butomus umbellatus* L.. Overall, the flooding regime had a strong impact on the plant communities in the rice paddies. High water levels and continuous flooding led to low species diversity and abundance. In contrast, significantly higher species richness was found in temporarily dry rice paddies (without permanent water). However, plant communities, especially those of temporarily drained paddies, were subject to considerable temporal dynamics. Whereas species richness and coverage of forbs declined, the abundance of graminoid species increased over time. Barnyard grass (*Echinochloa crus-galli* L.) was by far the most abundant species and occurred in all rice paddies, whereas pond lens (*Spirodela polyrhiza* L.) was restricted to submerged areas. Decreasing overall species richness during the growing season was paralleled by negative correlation with rice height, thus suggesting a strong rice-weed competition. The absence of this strong competition may have led to the observed high species richness of wetland plants along field edges. These findings emphasize the conservation value of the edge habitats.

The further analysed multidiversity in rice paddies, where botanical and faunistic surveys were included did not correlate with productivity (rice yield). These results suggest that there was no trade-off between food-production and biodiversity conservation in our rice paddy systems.

*Keywords:* Paddy rice, biodiversity, agroecology, rare species, paddy weed community, weed control

*Principal advisor:* Dr. Silvia Zingg