

## **Organic Intercropping and Living Mulch Progress report for April 1<sup>st</sup>, 2022-March 31<sup>st</sup>, 2023**

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Organic production based on intensive legume cropping for N supply might not be sustainable, thus we need to investigate other practices, such as intercropping, for its multiple potential benefits. Organic intercropping of grain legumes with more competitive crops provides an alternative to the lack of economic returns of green manure and the poor weed suppression ability of legumes.

### Intercropping (2021-2025):

All intercrops included a legume and a companion oilseed or cereal crop, in a range of seeding ratios in each combination: field pea-oat and lentil-barley seeded in mixed and alternate rows, and yellow mustard-chickling vetch in mixed rows.

Compared to their respective monocrops our objectives are to determine: the N benefit from the legumes, biomass, grain yield and quality of intercropped crops, if intercrops can reduce weed populations and diseases, and impact on the following sole grain crop (durum wheat).

A few highlights from pea-oat and lentil-barley in 2021 and 2022:

Weed biomass in monocrops was mostly highest in the legumes and lowest in the non-legumes, especially oat. There were mostly fewer weeds in the intercrops than in the legume monocrops.

Dry conditions negatively affected the competitiveness of the legumes in the intercrops, even when present at high seeding ratios, especially in 2021. In both years, lentil and pea had a lower crop biomass than expected based on their seeding ratios. Pea in both years, and lentil in 2021, also had a lower grain yield than expected. A somewhat more favourable environment in 2022 resulted in higher relative grain yield of lentil and pea in the intercrops than in 2021.

Dry weather had a lower impact on the non-legumes than on the legumes. Oat and barley had higher crop biomass and grain yield than expected, they were able to compensate for low seeding ratios, especially barley in 2022. A more favourable environment in 2022 resulted in greater growth of barley in the intercrops than in 2021, while an increase of oat growth in the intercrops was less marked in 2022 than in 2021.

Grain weight of cereals: relative to the monocrops, in mixed rows barley grain weight increased by 12% in both 2021 and 2022, while oat grain weight increased by 20% in 2021 and 6% in 2022.

### Living legume mulches (2021-2025):

The 2021 trial did not grow well, especially some treatments due to drought conditions. In the 2022 site year, all data was collected again in the Living Legume Mulch trial. Although the results are promising, results from this study are still inconclusive. Therefore, no results are currently available.