

Cut-and-Carry Systems in Organic Vegetable Production

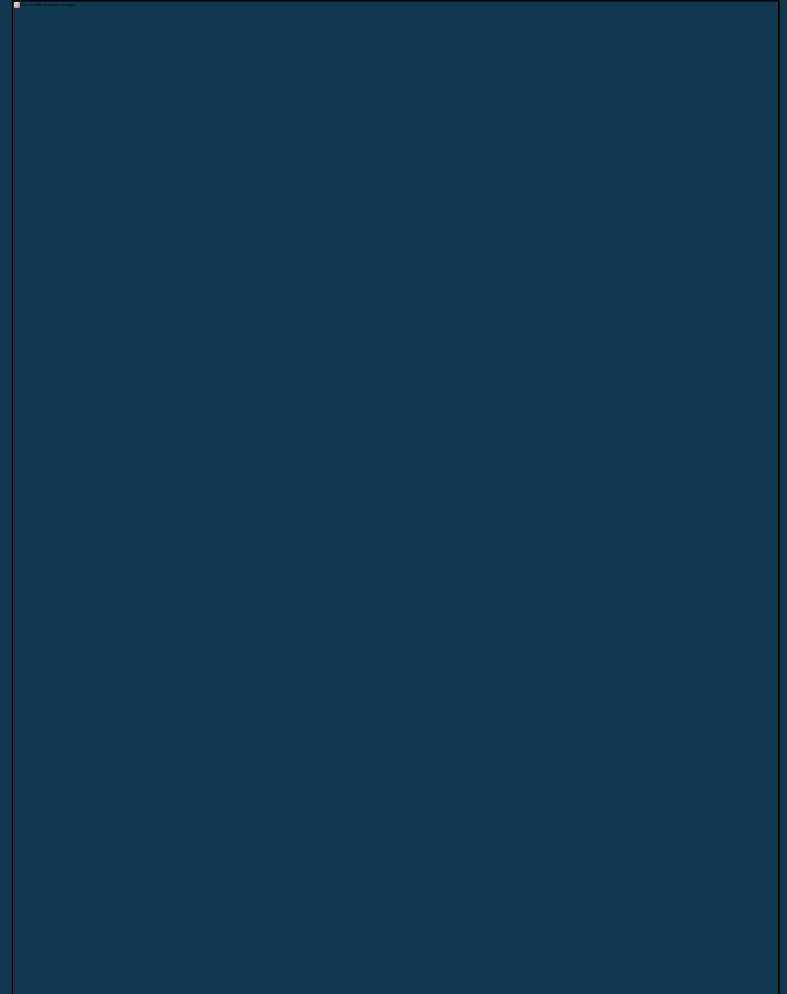
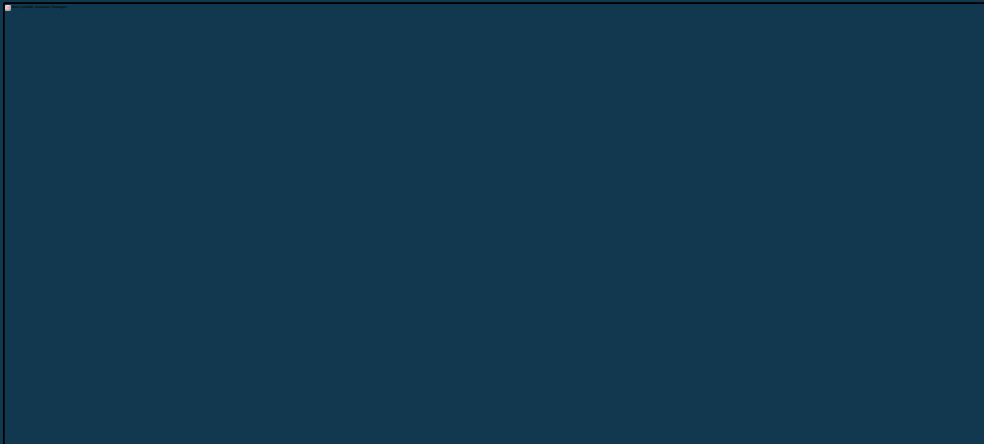
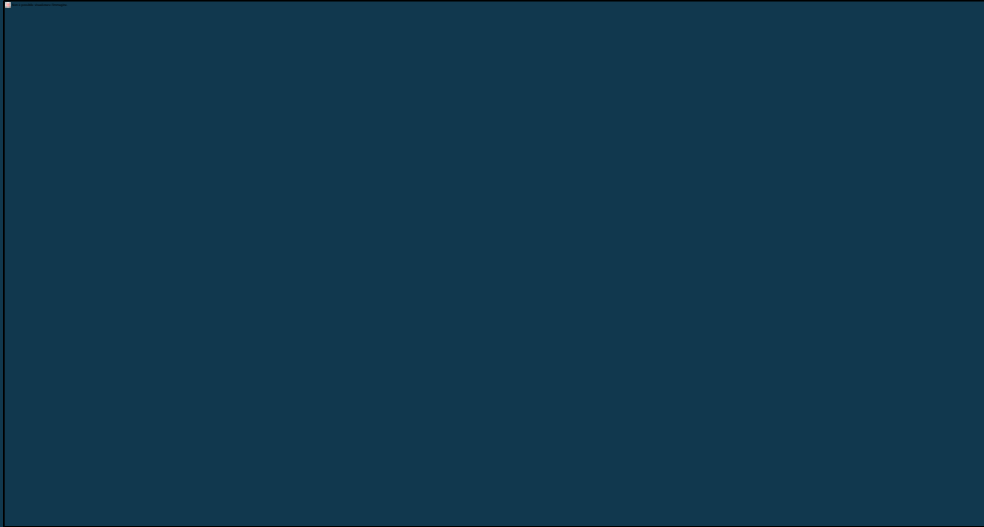
Apparent Net N Mineralization of Soil Surface Applied and Incorporated Grass-Clover Cuttings



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- Sole N source in organic production without accompanying nutrients (*Balanced plant nutrition*)
- Allow for a reduction in the use of (problematic) organic fertilizers from conventional sources (*System boundary of organic farming?*)
- Positive non-N-effects if integrated in crop rotations

Mulch Planting with MuroCut (Baertschi Agrartecnic, Baienfurt, Germany)



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Application of potentially high N amounts:

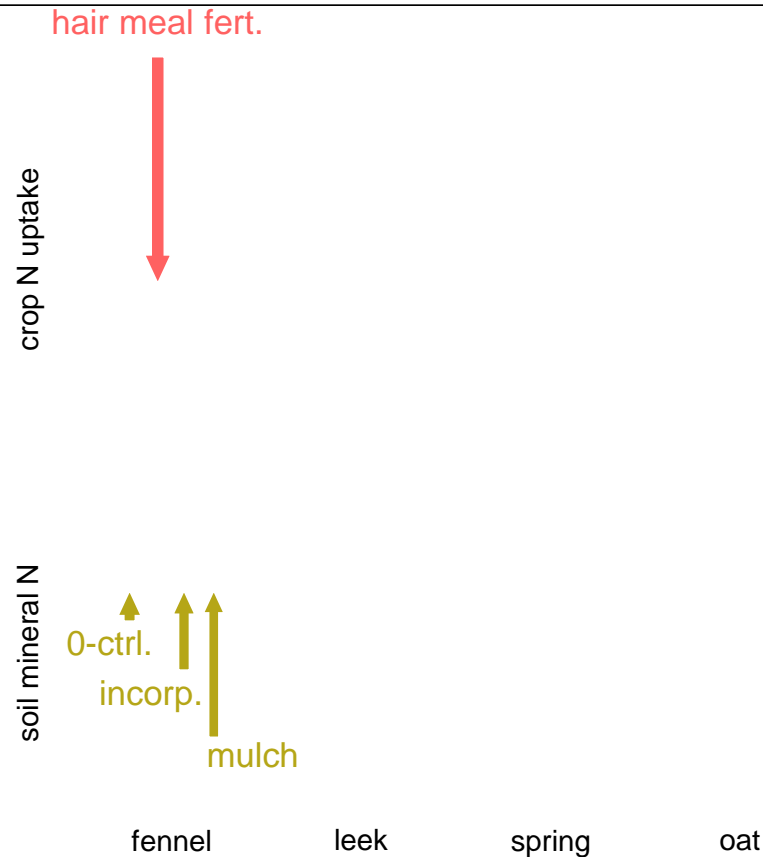
- Recommended mulch layer thickness (weed control): 7-10 cm
≈ 15 t TM/ha
≈ **250 - 500 kg N ha⁻¹** (1.7-3.3 % N in DM)
- N amount applied with mulch biomass generally not related to crop N demand

- Evaluation of N dynamics and N efficiency
 - N fertilizer value
 - Leaching losses (residual SMN)
 - Residual N effect on subsequent crops

- Implications for practice
- Data provision to DSS (N-Expert, IGZ)

- Compatibility with (national) fertilization directives

Exp. I (2015-2016): fennel (silage) – leek (fresh cuttings) – oat



applied N amounts (kg N ha⁻¹)

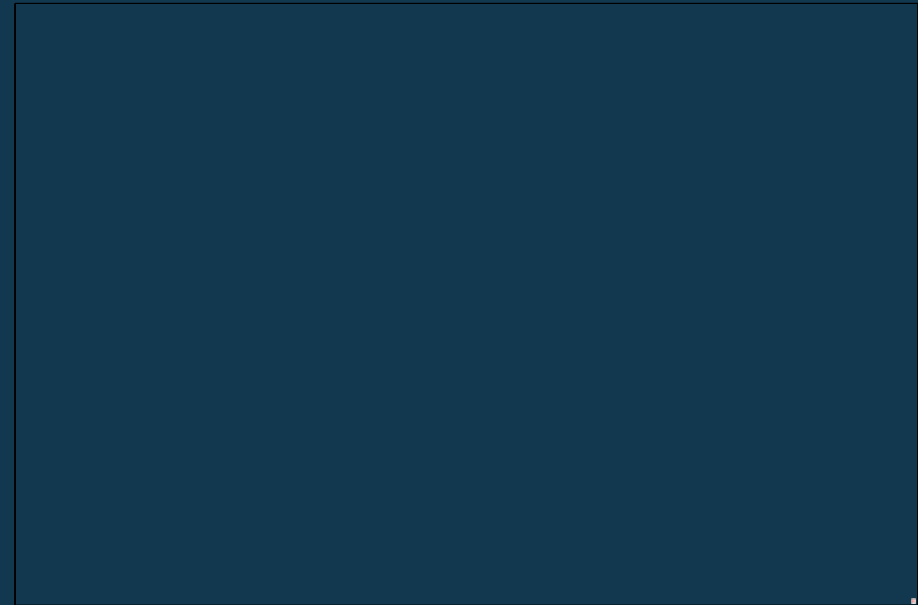
fennel

hair meal fert.	157 (C:N 3.5)
silage incorp.	180 (C:N 16.2)
silage mulched	450 (C:N 16.2)

leek

hair meal fert.	177 (C:N 3.5)
fresh cut. incorp.	150 (C:N 41.9)
fresh cut. mulched	223 (C:N 41.9)

Exp. I (2015-2016):
fennel (silage) – leek (fresh cuttings) – oat



Phytotoxic effect of silage under fleece cover

Exp. II (2016-2017):
fennel (silage) – leek (fresh cuttings) – oat



- Specific agronomic perils: phytotoxicity, regrowth of grass
- Poor performance of silage
- aNNM of surface mulch approx. within 5-25 % and less C:N-sensitive
 - gaseous N losses
 - positive mulch effects on soil N mineralization
 - effect of mulch layer thickness on aNNM
- aNNM of soil incorporated cuttings with low C:N potentially comparable to commonly used organic fertilizers
- Residual N effect of soil incorporated and mulched cuttings only slightly/tendentially higher than that of organic fertilizer
 - aNNM within the year of application strongly affects medium-term N balance (crop rotation)