Overseeding a cereal and legume crop mix in established alfalfa: which impacts on weeds and production?

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Alfalfa is a sensitive crop to weed soiling during the winter. This study investigates the impact of overseeding a mix of cereals and legumes crop in autumn on weed development during the winter and on the alfalfa annual production. In 2022, three trials were carried out in west of France on established alfalfa.

Objectives

The objectives of these trials is to investigate the impact of overseeding cereal and legumes crop mix in alfalfa on weed pressure and annual production.

Treatments and experimental design

	Treatment name	Overseeding and type of Mix (seeds/m²)	Cutting strategy	Weed control
M1	Early Control	No Overseeding	Early	No
M2	Classic Control	No Overseeding	Classic	No
M3	Weeding Control	No Overseeding	Classic	Yes
M4	Seeder Control	Seeder alone	Classic	No
M5	Early Clover Mix	Rye(150)/Com. V.(20)/ Crim. C.(110)	Early	No
M6	Early Faba. Mix	Rye(100)/Com. V.(25)/ Faba.(10)	Early	No
M7	Classic Faba. Mix	Rye(100)/Com. V.(25)/ Faba.(10)	Classic	No

Crim. C. = Crimson Clover, Com. V.= Common Vetch, Faba. = Fababeans

3 trials

- trial 1 and 2 on forage production: 3 to 5 forage cutting a year, inter-row of alfalfa 12 to 20 cm
- trial 3 on alfalfa seed production: 1 forage cutting and 1 seed harvest, inter-row à 50 cm

Experimental Design
Blocs with 3 or 4 replicates

Forage cutting strategy

→ Early = initiation stage of alfalfa (mid april)

→ Classic = budding stage of alfalfa (early may)

Weeded M3
Chemical for trials 1 and 2, mechanical for trial 3

Spring weed biomass

Tukey test (5%)	Location (Dpt)	RSE (DMT/ha)
Trial 1	La Roche-sur-Yon (85)	0.18
Trial 2	Saint-Laurent-des-Autels (49)	0.49
Trial 3	Brain-sur-l'Authion (49)	0.27

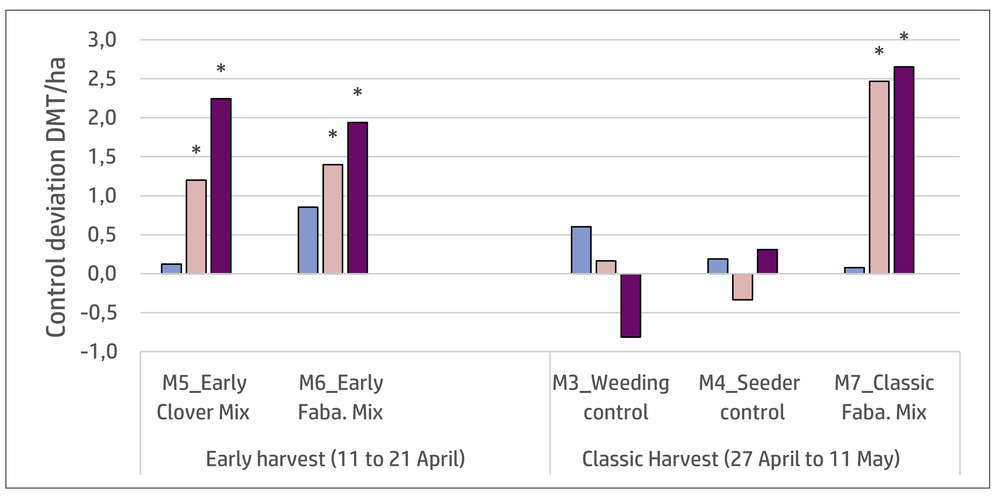
Trial 1: No effect on weed biomass in overseeding methods

Trials 2 and 3: Tendency to reduce weed biomass, but no statistical difference with non-weeded controls of the same harvest date (M1 vs M5 and M6, and M2 vs M3, M4 and M7)

Trial 3: Significant reduction in the weed population (weeds/m²) in the overseeding methods). The weed population is reduced to a similar or lower level than the mechanically weeded modality (result not shown).

Trial 2: A reduction in trend of weed biomass on M4 unexplained.

Forage Productivity



Yield gain on the 1st forage cutting in two out of three trials in overseeding methods:

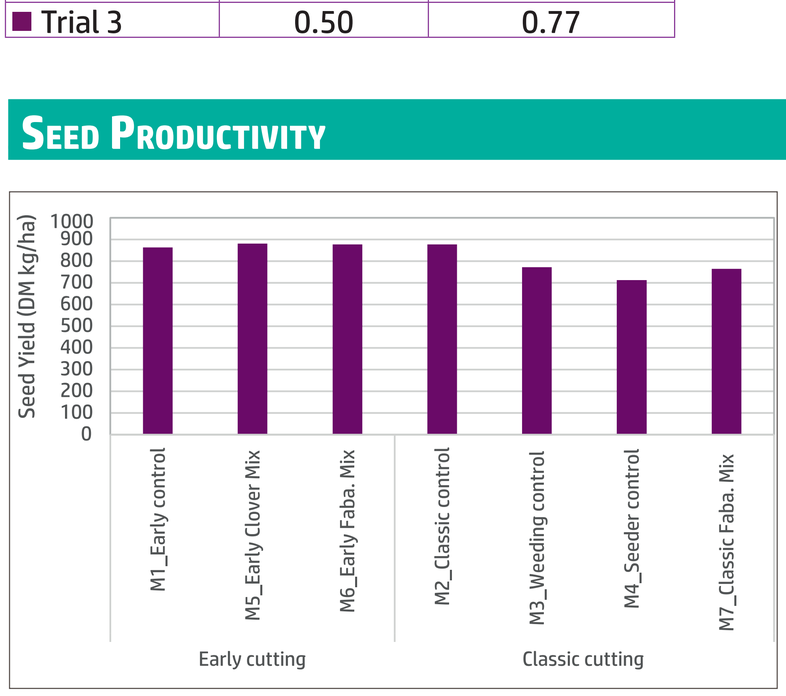
→ Early cutting: + 1.2 to 2.2 DMT/ha

→ Classic cutting: + 2.5 to 2.7 DMT/ha

One out of three trials without any yield gain (trial 1)

Tukey test (5%)	Early cutting RSE (DMT/ha)	Classic cutting RSE (DMT/ha)
Trial 1	1.39	0.30
Trial 2	0.39	0.23
Trial 3	0.50	0.77

Seed Productivity



Trial 3: no significant effect of overseeding and cutting date on seed yield.

Discussion - Conclusion

2/3 trial with promising results

- Weeds: promising decrease in biomass (2 trials), significant reduction on weed population (1 trial)
- No effect in seed production
- Gain of forage Yield in the first cutting
  + 1.2 à 2.2 DMT/ha Early cutting → +1.8 à 2.1 DMT/ha total of year
  + 2.5 à 2.7 DMT/ha Classic cutting → +2.2 DMT/ha total of year

1/3 trial without any significant difference

Hypothesis: Strong competition from alfalfa (more than 10 DMT/ha) and/or white clover did not allow to the overseeded mix to develop.

3 new trials in 2023 on new fields

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