

# Alternative weed control in perennial rye-grass seed crop

## INTRODUCTION

In seed grass french production, the certification standards are increasingly difficult to reach in view of the growing difficulties of weeding (few herbicides available, resistant weeds...). The example of perennial rye-grass seed crop is developed here, a species for which there are few effective chemical solutions against black grass (*Alopecurus myosuroides*), but also against some dicotyledons. For this culture carried out at low inter-rows, mechanical weeding such as hoeing is not easy to set up. This study aims to look at alternative solutions.



## MATERIAL AND METHODS

Trials were set up for two years (2020/2021 and 2021/2022) on a single site in Saint-Pouange (France), included 6 modalities without repetition, with plots of approximately 300m<sup>2</sup>. Two first modalities concerned undersowing in a spring cover crop: pea or buckwheat. The two others are sowed early in bare soil in summer in association with a no frost-resistant plant: mustard (year 1), fenugreek (year 2) and foxtail millet (*Setaria italica*) (both year). These four modalities were coupled with passages of weeder harrow. The last two modalities were sowed in bare soil at the end of summer, one will be managed only with a camera guided hoe and the other with chemical herbicides.

Table I - Main dates for the two years of trial

Modalities	Pea	Buckwheat	Mustard	Fenugreek	Foxtail millet	Mechanical	Chemical
Sowing	March: Peas 300kg/ha Rye-grass 13kg/ha	May or June: Buckwheat 50kg/ha Rye-grass 13kg/ha	July: Mustard 7,5kg/ha, Fenugreek 15kg/ha, Foxtail millet 8kg/ha - Rye-grass 13kg/ha			September: Rye-grass 13kg/ha	
Cover crop harvest	July: peas 15-20q/ha	August 21 or October 22: buckwheat 9q/ha					
Chemical weeding							Autumn (graminicides) and in Spring (broadleaf)
Mechanical weeding	October: one weeder harrow passage March 22: one weeder harrow passage			March 22: one weeder harrow passage		March one hoeing	



Ryegrass under peas in May



Ryegrass under buckwheat in October



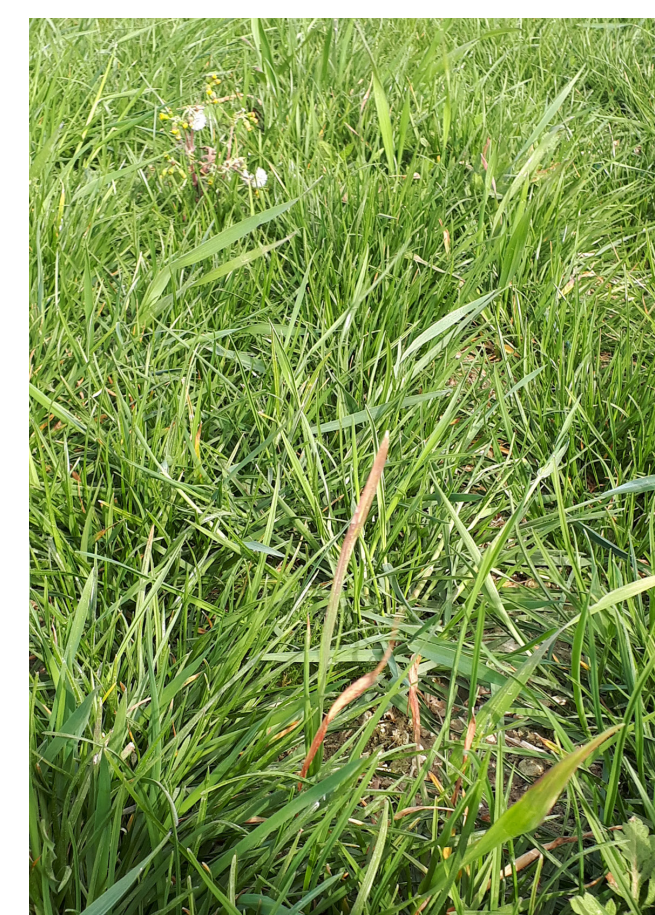
Ryegrass combined with mustard in November



Ryegrass combined with fenugreek in November



Ryegrass combined with foxtail millet in September

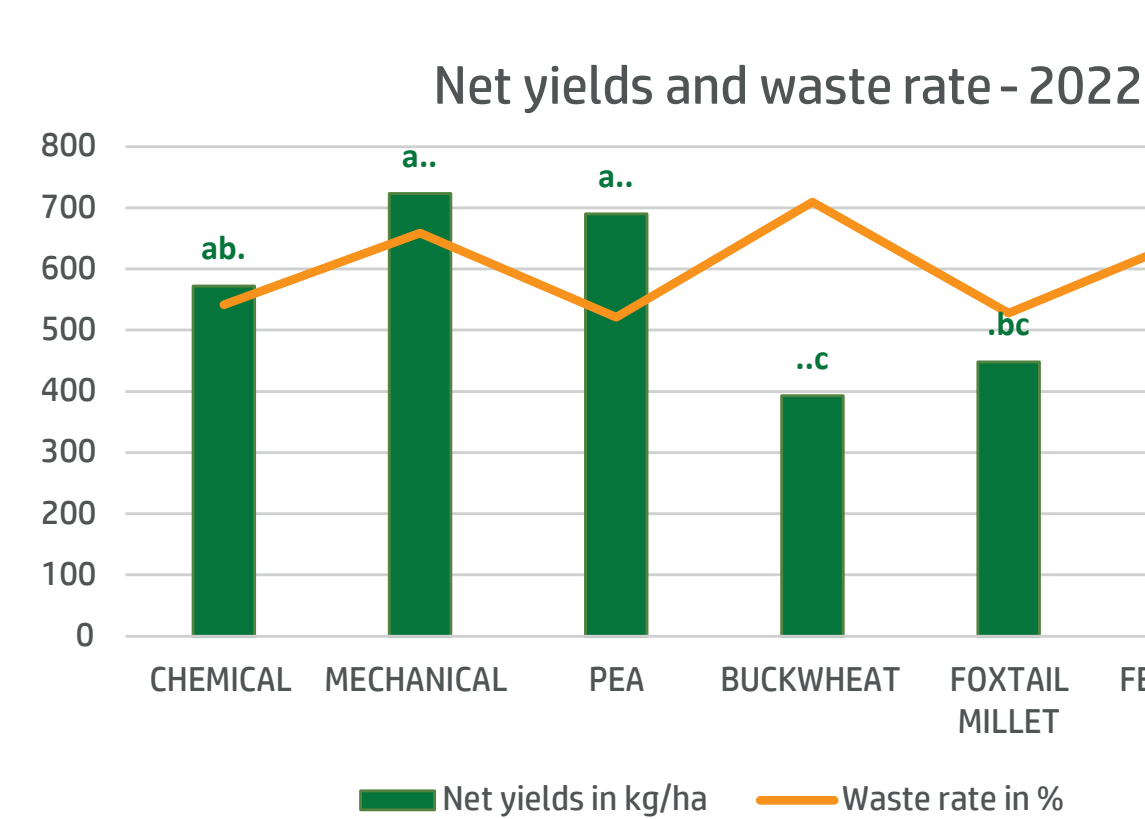
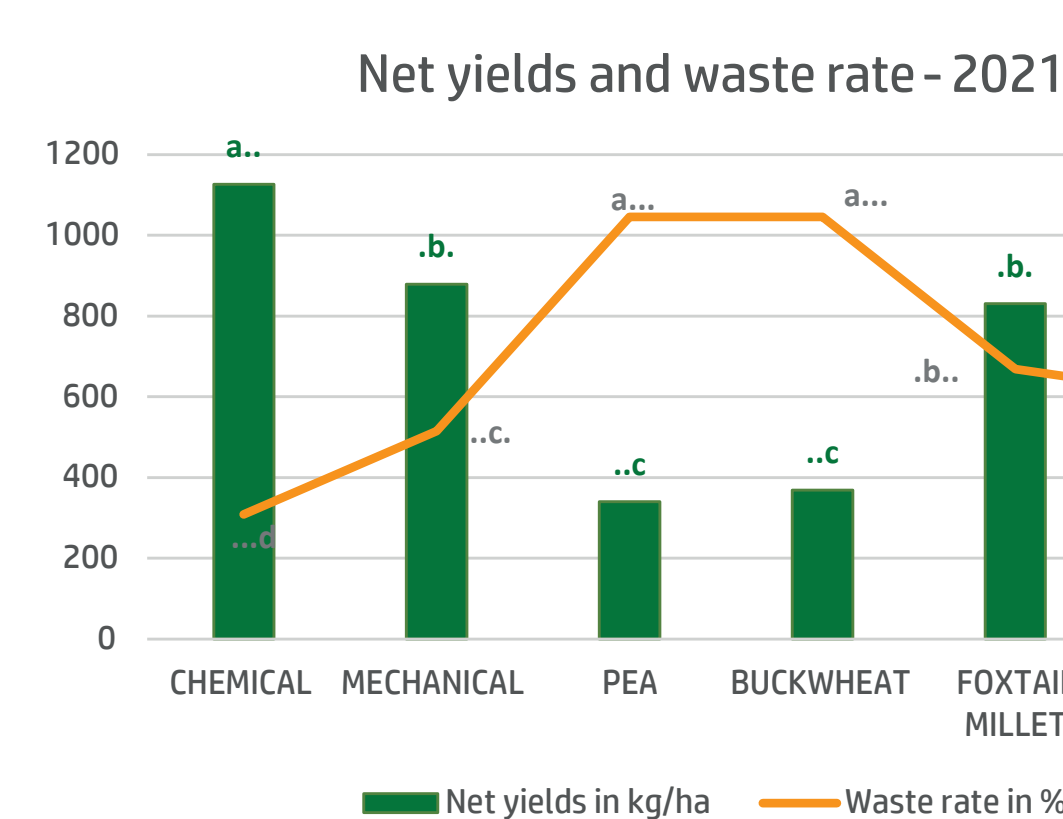
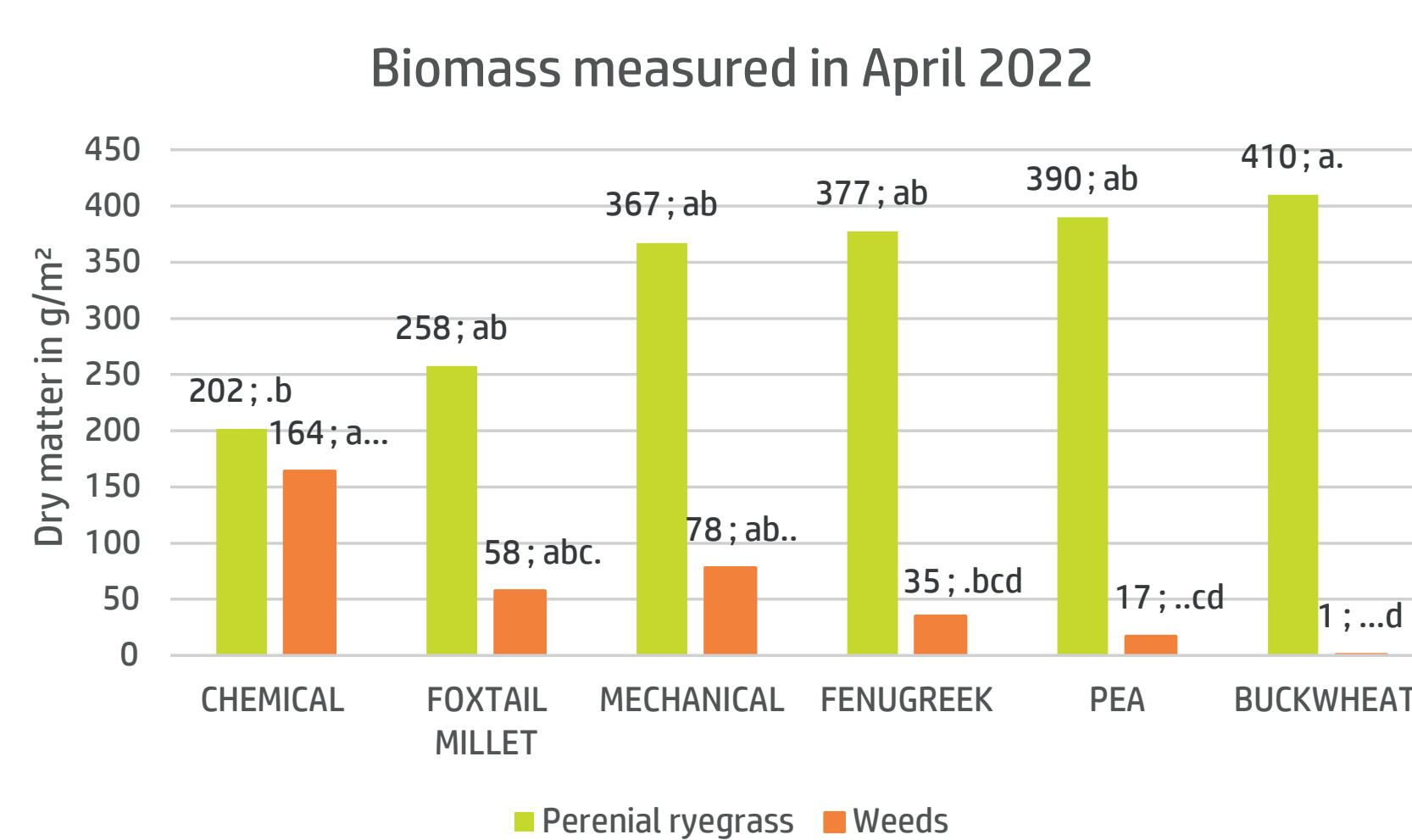
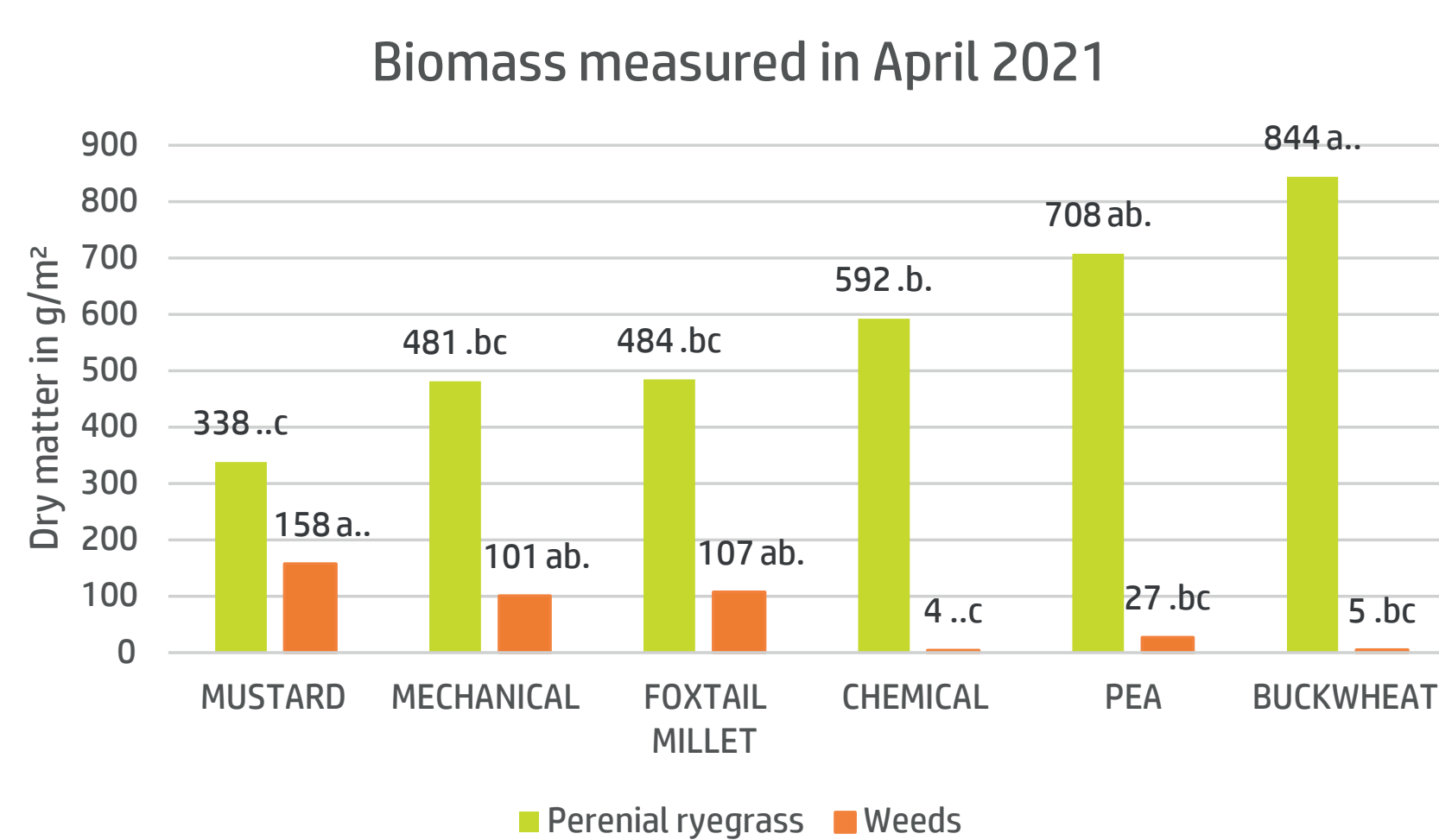


Ryegrass before hoeing in March



Ryegrass sown in bare soil

## RESULTS



Certified perennial ryegrass seed standards

Minimum specific purity 96% and maximum rate of seeds of other plants 1.5%, including a maximum of 0.5% quitch (*Elymus repens*) and 0.3% black-grass.

		Specific purity	Other seeds	Black grass	Quitch	Respect of the standards
Rate in 2021	CHEMICAL	99.7	0.2	0.2	0	YES
	MECHANICAL	96.5	3.2	3.19	0	NO
	PEA	98.7	0.2	0.2	0	YES
	BUCKWHEAT	99	0.3	0.3	0	YES
	FOXTAIL MILLET	95.6	3.8	3.75	0	NO
	MUSTARD	89.6	10.1	10	0	NO
Rate in 2022	CHEMICAL	93.1	6.4	6.2	0	NO
	MECHANICAL	96.4	2.3	2.2	0	NO
	PEA	97.6	2.1	0.1	0	NO
	BUCKWHEAT	98.2	1.3	0.4	0	NO
	FOXTAIL MILLET	98	1.6	1.3	0	NO
	FENUGREEK	96.8	2.7	2.4	trace	NO

## CONCLUSION

Mechanical weeding is really difficult to implement: Weeder harrow in post-emergence is not efficient enough, but allows to remove crop residues (pea, buckwheat) / Camera guided hoe has difficulties to find its way at a narrow spacing (12,5cm) in March (ryegrass covering the inter-rows) and it is very complicated to may a passage in autumn between the stage of the crop (4 tillers-minimum) and the climate. Associated crops had a limited effect on weeds, as well as establishment difficulties. The under cover method allows a significant limitation of weeds, in particular black grass, but the yield of ryegrass seems to be strongly impacted by this pratical, especially under cover of buckwheat.