



# CENTRO DI RICERCA SCIENZE DELLE PIANTE



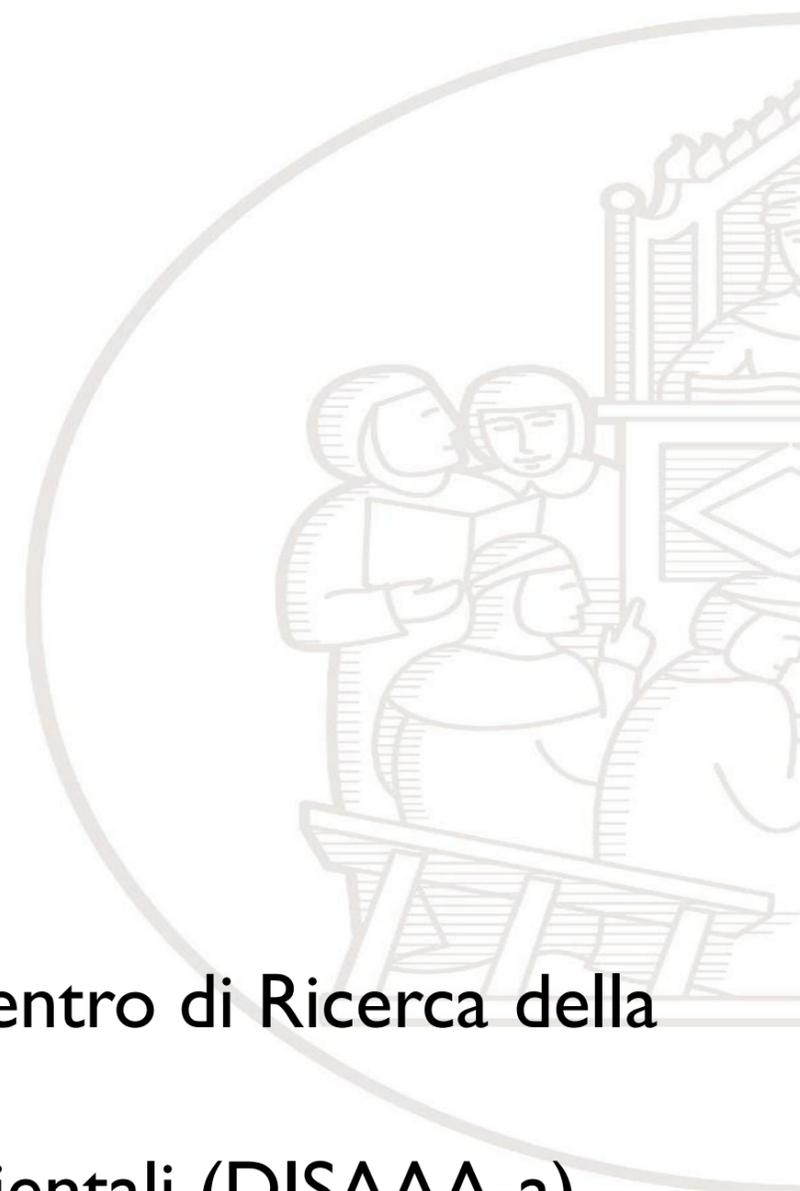
**Sant'Anna**  
Scuola Universitaria Superiore Pisa

## L'agroecologia a supporto della transizione ecologica - storie di successo.

**Camilla Moonen – relatrice**

Credits:

- Paolo Bàrberi, Stefano Carlesi, Federico Leoni: Gruppo di Agroecologia, Centro di Ricerca della Pianta, Scuola Superiore Sant'Anna ([@GoAgroecology](#))
- Daniele Antichi: Dipartimento di Scienze Agrarie, Alimentari ed Agro-Ambientali (DISAAA-a) - Università di Pisa



# Agroecologia

Ecologia dei sistemi colturali, prendendo in considerazione tutto ciò che succede tra il coltivatore e il consumatore, o tra campo e il piatto (studiando i food systems).

Agroecologia è:

- Un approccio scientifico e di formazione: ricerca partecipativa e transdisciplinare
- Un movimento sociale e politico: dare potere decisionale ai produttori, non solo alle multinazionali o alle grandi industrie
- Un insieme di tecniche colturali: basato sull'ecologia, approccio olistico e 'food system' è un'entità sistemica.

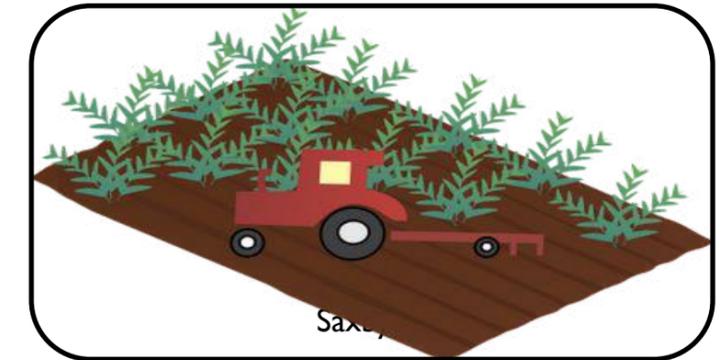


# Le tecniche di gestione culturale agroecologiche

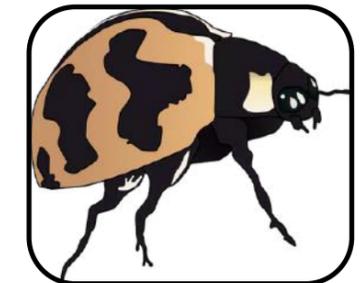
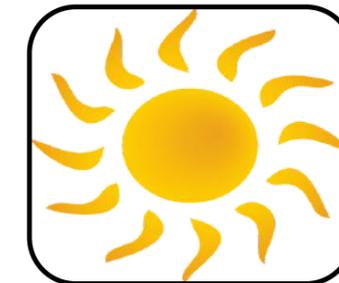
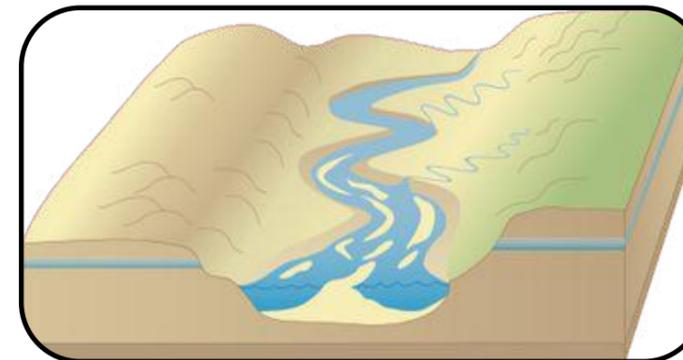


# La relazione tra territorio & agricoltura

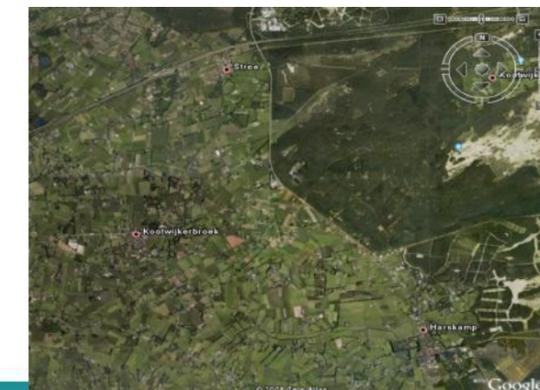
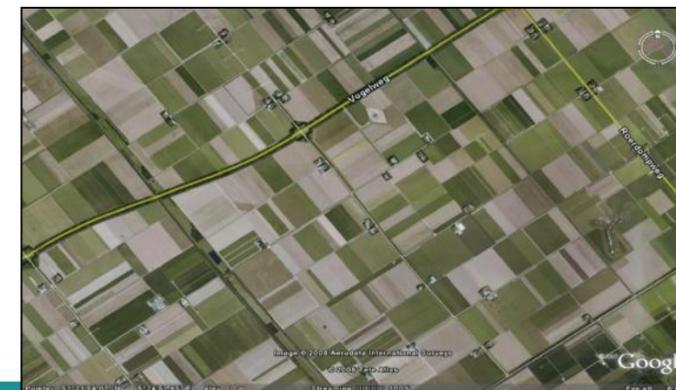
Le pratiche agricole



Le risorse naturali



La configurazione spaziale



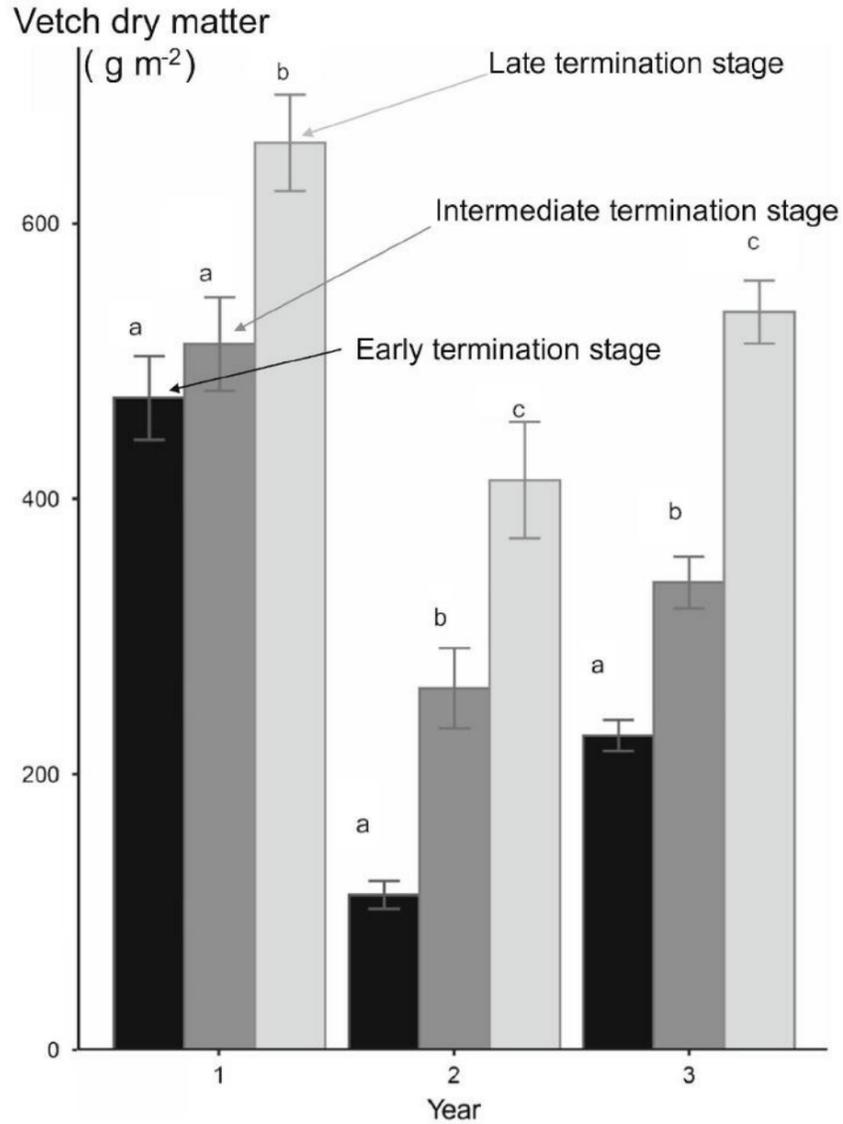
# Due storie di successo

1. Coltivare su sodo senza glifosate e con il crimper roller
2. Produrre di più senza input chimici – la bulatura con leguminose





# Coltivare su sodo senza glifosate con la vecchia e il crimper roller

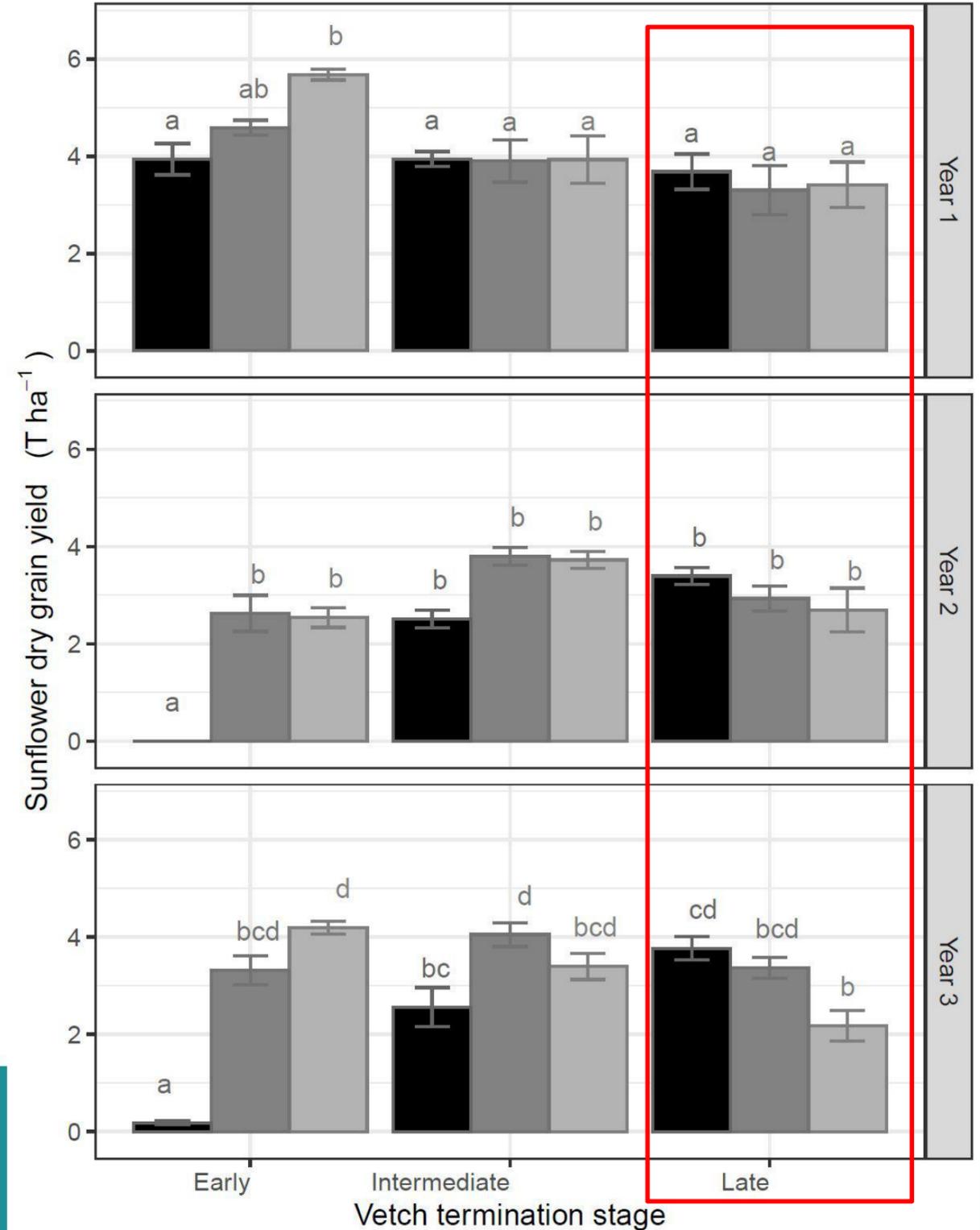


**Fig. 2.** Hairy vetch aboveground dry biomass in the three experimental years (2013 = year 1; 2014 = year 2; 2015 = year 3) as affected by termination stage, across all glyphosate rates. Within each year, treatments with the same letter are not significantly different at  $P \leq 0.05$  (Tukey's HSD test). Confidence intervals at 95% of the actual data (1.96 times the standard error), are shown on top of each bar.

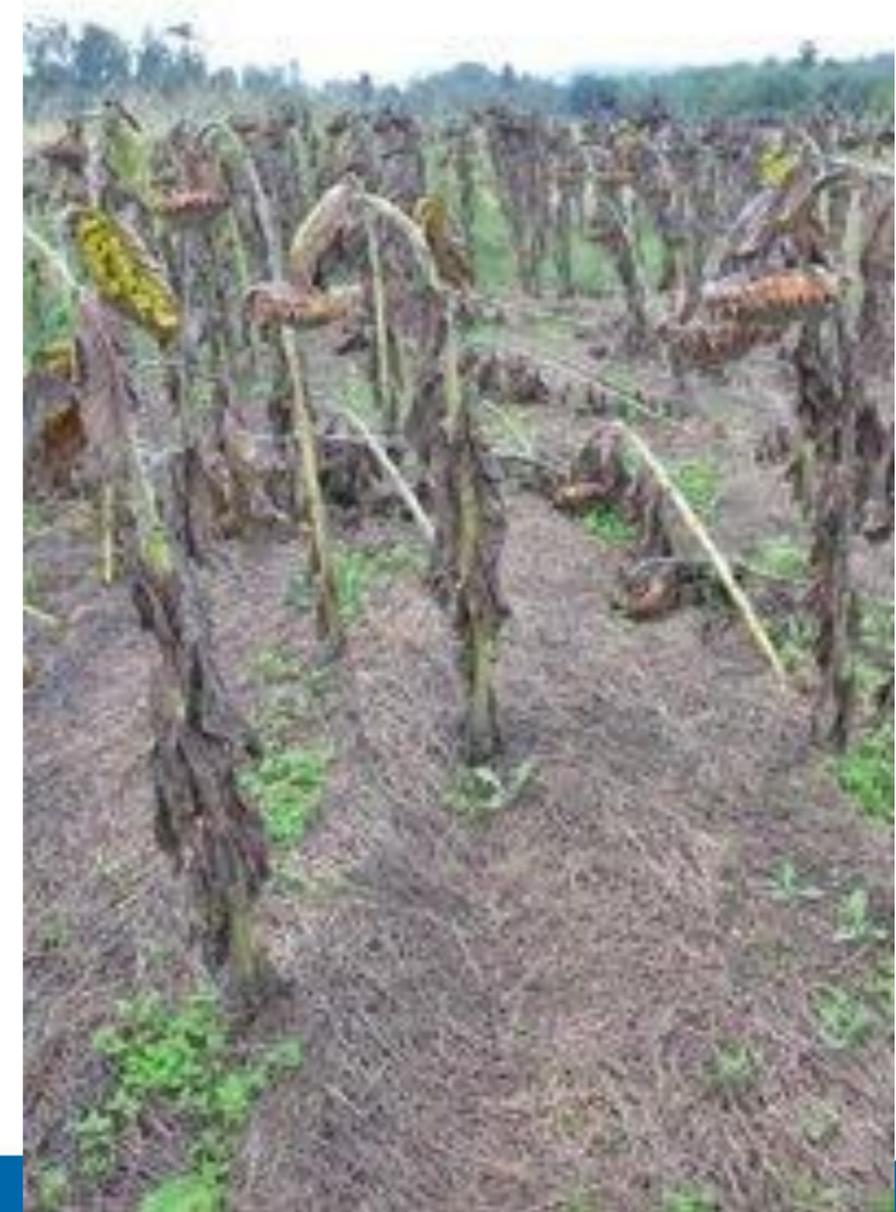
Glyphosate rate



## Girasole acheni (t/ha)



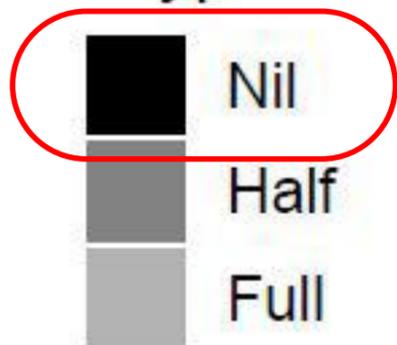
# Girasole sulla pacciamatura di vecchia dopo la devitalizzazione con il crimper roller: da notare bassa infestazione di malerbe



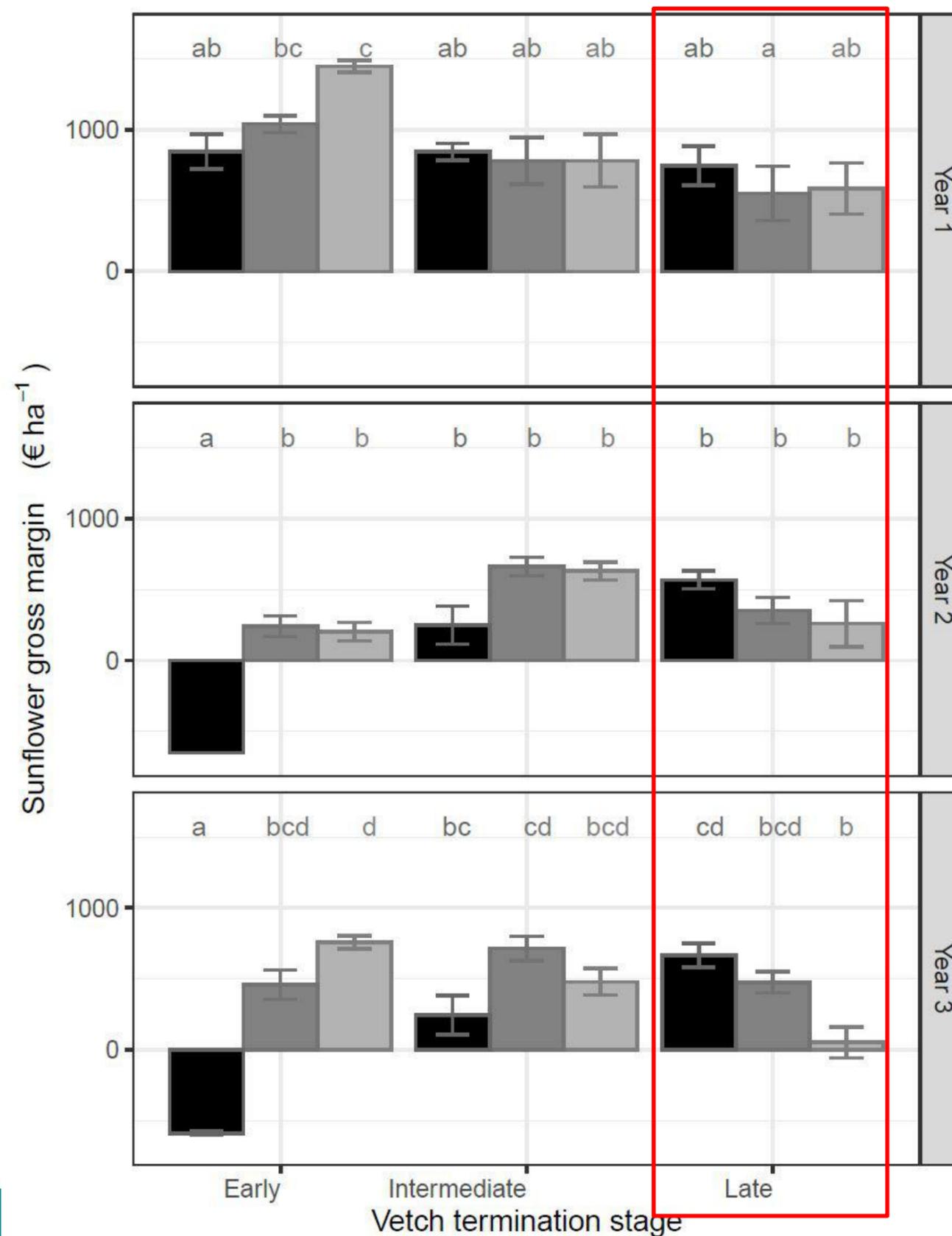
# Coltivare su sodo senza glifosate

- dati economici

Glyphosate rate

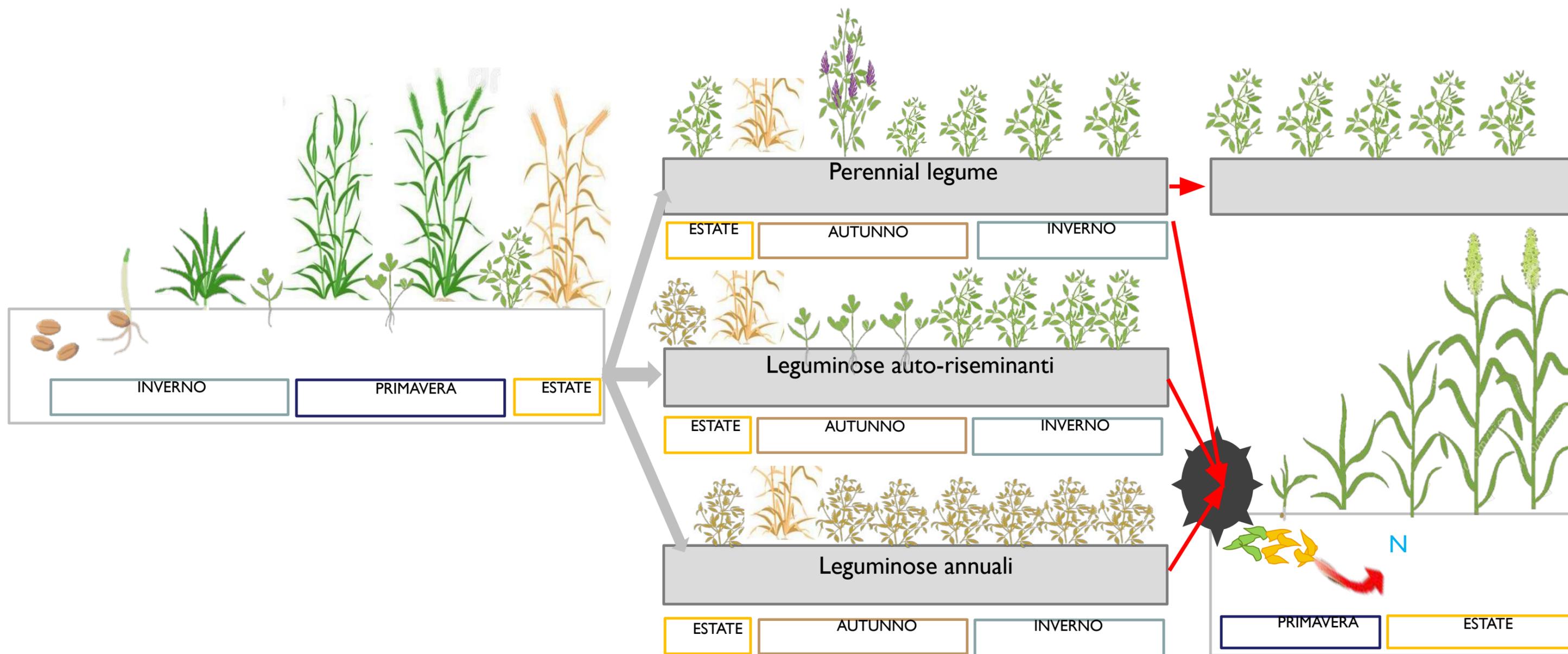


## Girasole

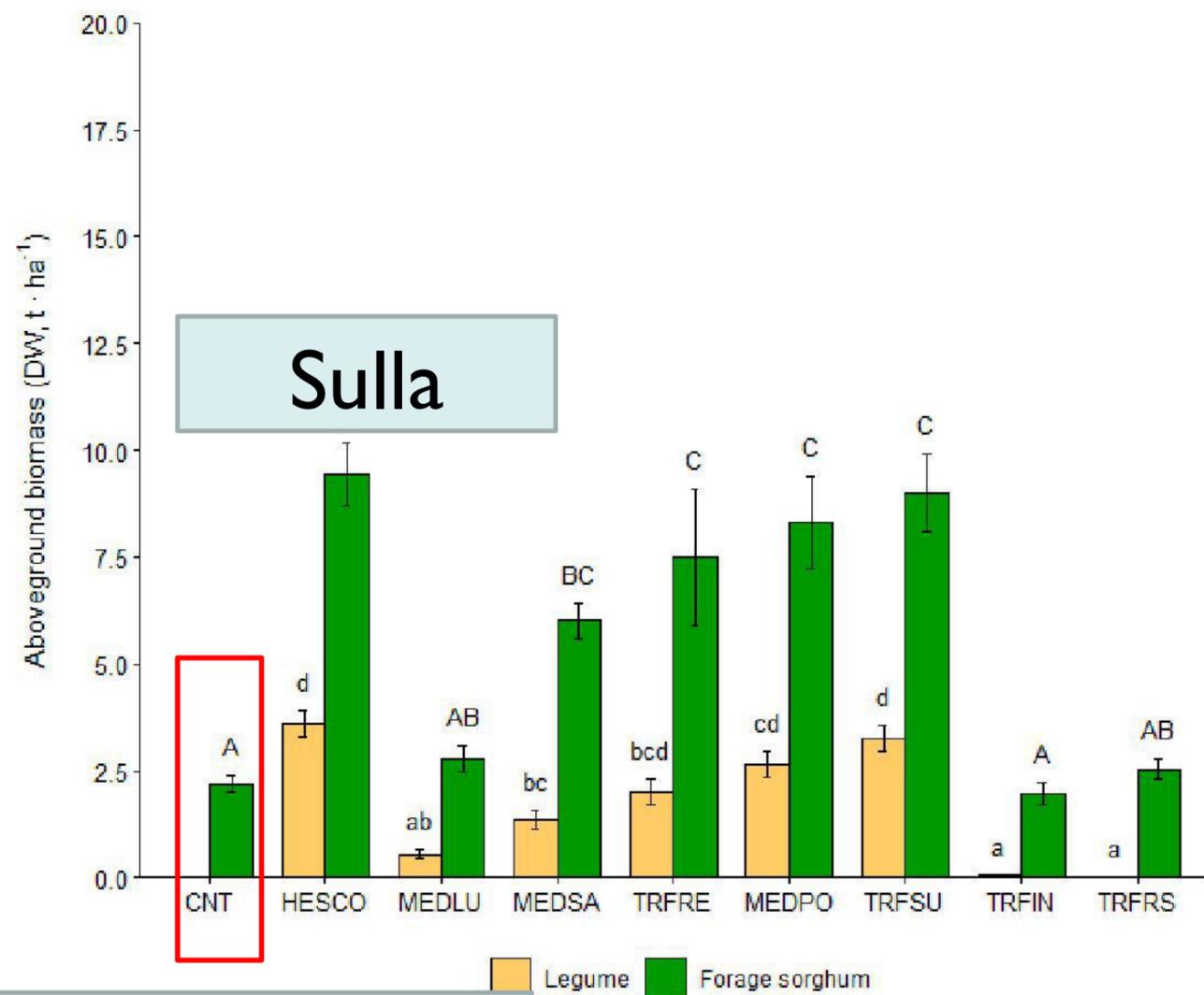


# SCELTA DELLA LEGUMINOSA

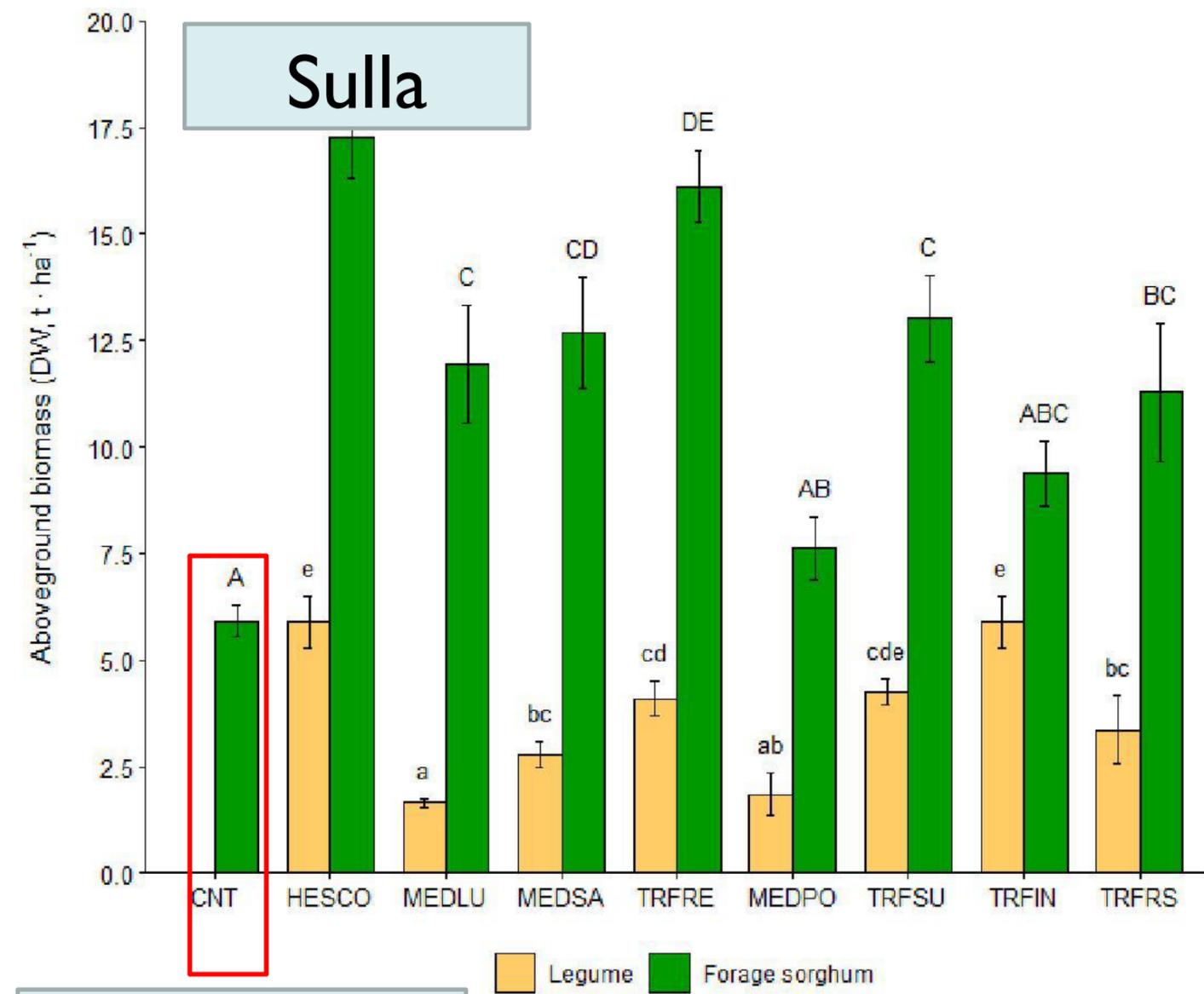
## Quale leguminosa per una buona resa nel sorgo successivo?



# Produrre di più con meno – biomassa di **leguminose** e **sorgo da foraggio**



**Sistema senza leguminose**

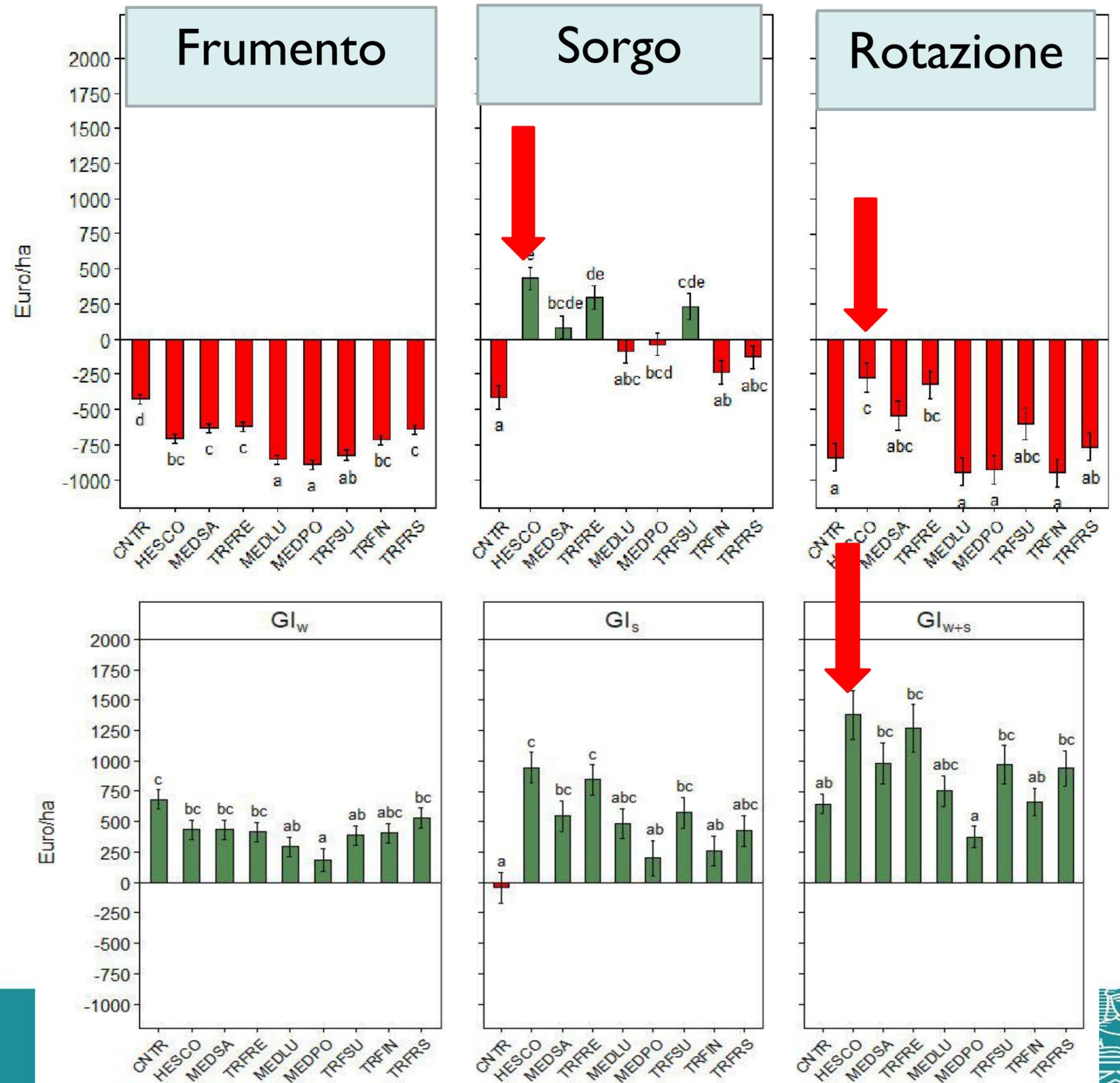


**Sistema senza leguminose**



Produrre di più con meno –

- I vantaggi economici a livello della rotazione





**Grain production  
4.8 t/ha\*\***

**Forage  
production  
21 green t/ha\*\***

-Tillage: **164€/ha**  
-Seed bed : **94€/ha**  
-Sowing (seeds + mechanical seed drills): **204€/ha**

-Intersowing (seeds + Hoeing + -Mechanical seeder): **284€/ha**

-Harvest: **130€/ha**

-Legume termination: **68€/ha**  
-Tillage: **164 €/ha**  
-Seed bed : **94 €/ha**  
-Sowing (seeds + mechanical seed drills): **139 €/ha**

-Harvest: **264 €/ha**

					TOT €/ha	Gross margin €/ha	
Costs	<b>462 €/ha</b>	<b>284 €/ha</b>	<b>130 €/ha</b>	<b>465 €/ha</b>	<b>1605</b>	<b>483</b>	Gestione a basso input + living mulch
Incomes			<b>1080 €/ha</b>	<b>1008 €/ha</b>	<b>2088</b>		

					TOT €/ha	Gross margin €/ha	
Costs	<b>664 €/ha</b>	<b>266 €/ha</b>	<b>130 €/ha</b>	<b>702 €/ha</b>	<b>2026</b>	<b>428</b>	Gestione convenzionale
Incomes			<b>1350 €/ha</b>	<b>1104 €/ha</b>	<b>2454</b>		

Grazie della vostra attenzione.  
Siamo a disposizione per approfondimenti e chiarimenti.

[c.moonen@santannapisa.it](mailto:c.moonen@santannapisa.it)



DOI: <https://doi.org/10.1007/s13593-022-00787-3>



## CONVENTIONAL MANAGEMENT



Grain production 6 t/ha*		Forage production 23 green t/ha*		TOT €/ha	Gross margin €/ha
-Tillage: <b>164€/ha</b>	-Mechanical weed control: <b>59€/ha</b>	-Harvest: <b>130€/ha</b>	-Tillage: <b>164€/ha</b>		
-Seed bed: <b>94€/ha</b>	-Fertilisation: <b>138€/ha</b>		-Seed bed: <b>94€/ha</b>		
-Sowing (seeds + mechanical seed drills): <b>204€/ha</b>	-Fungicides: <b>69€/ha</b>		-Sowing (seeds + mechanical seed drills): <b>139 €/ha</b>		
-Chemical weed control: <b>74€/ha</b>			-Chemical weed control: <b>74€/ha</b>		
-Fertilisation: <b>128 €/ha</b>			-Fertilisation: <b>231€/ha</b>		
<b>664 €/ha</b>	<b>266 €/ha</b>	<b>130 €/ha</b>	<b>702 €/ha</b>	<b>2026</b>	<b>428</b>
<b>1350 €/ha</b>		<b>1104 €/ha</b>		<b>2454</b>	

## LOW-INPUT MANAGEMENT + RELAY INTERCROPPING OF LEGUMES

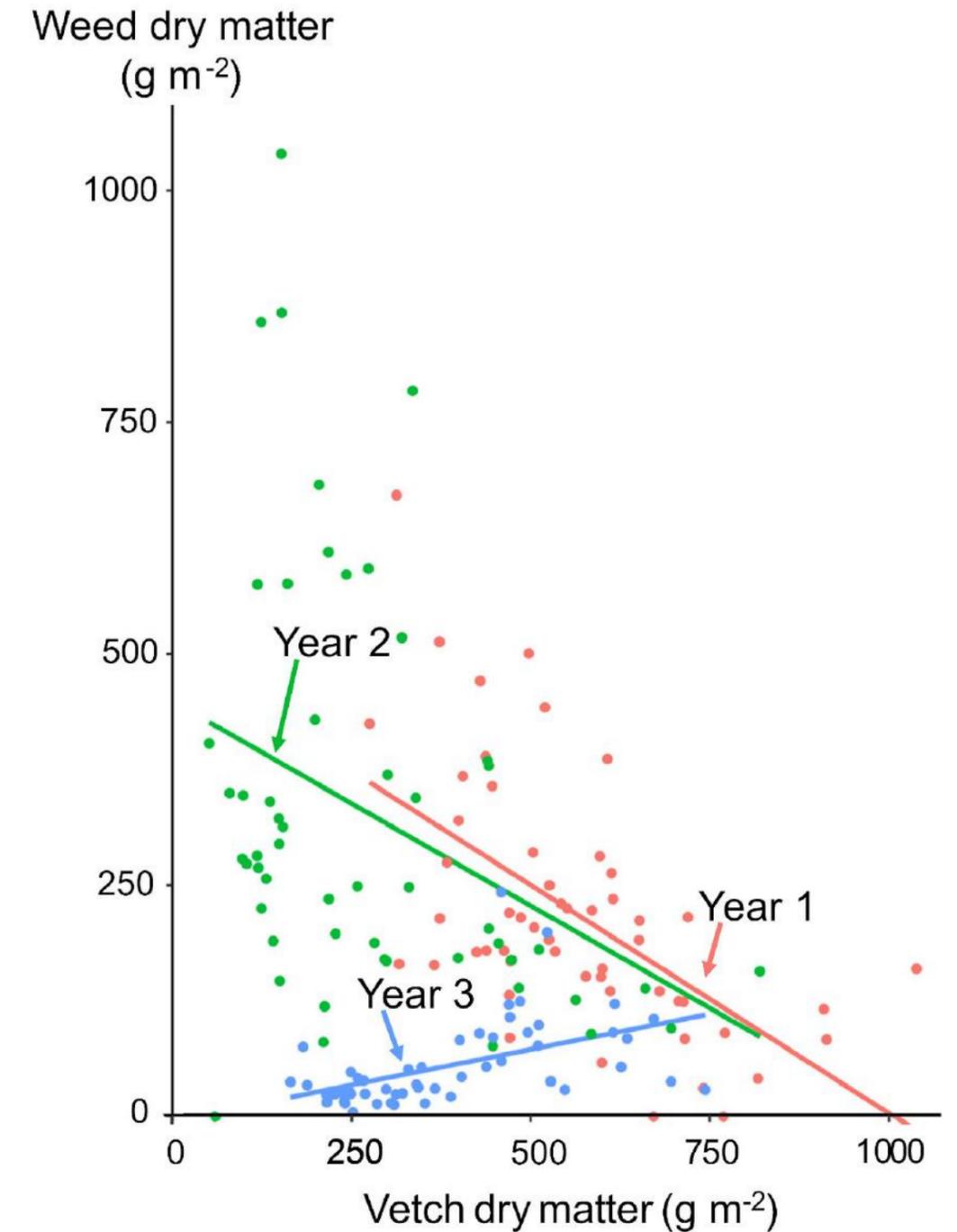


Grain production 4.8 t/ha**		Forage production 21 green t/ha**		TOT €/ha	Gross margin €/ha
-Tillage: <b>164€/ha</b>	-Intersowing (seeds + Hoeing + -Mechanical seeder): <b>284€/ha</b>	-Harvest: <b>130€/ha</b>	-Legume termination: <b>68€/ha</b>		
-Seed bed : <b>94€/ha</b>			-Tillage: <b>164 €/ha</b>		
-Sowing (seeds + mechanical seed drills): <b>204€/ha</b>			-Seed bed : <b>94 €/ha</b>		
			-Sowing (seeds + mechanical seed drills): <b>139 €/ha</b>		
			-Harvest: <b>264 €/ha</b>		
<b>462 €/ha</b>	<b>284 €/ha</b>	<b>130 €/ha</b>	<b>465 €/ha</b>	<b>1605</b>	<b>483</b>
<b>1080 €/ha</b>		<b>1008 €/ha</b>		<b>2088</b>	

The quotations for agriculture operations and services were obtained from Regional Agricultural Mechanic Entrepreneurs' Association Price List referred to 2019-20 and include variable costs, downtime, insurance, depreciation, labour, machinery servicing and maintenance. The price quotation for productions (wheat and sorghum) refers to Bologna Stock Exchange for cereal grains and to the Chamber of Commerce of Brescia for forage sorghum. \* data estimated according to the production level of nearby fields; \*\* data obtained from the experiment as average of production level of plots.



# Girasole senza glifosate extra



**Fig. 4.** Relationship between hairy vetch aboveground dry biomass and total weed biomass at cover crop termination in the three years of trial: 2013 (year 1), 2014 (year 2) and 2015 (year 3). Data were pooled across vetch termination stages. The slope of the regression line was significantly different from zero in year 1:  $y = 490 - 0.59x$  ( $t$  ratio  $-4.076$ ;  $P < 0.001$ ) and year 2:  $y = 440 - 0.44x$  ( $t$  ratio  $-4.044$ ;  $P < 0.001$ ) but not in year 3 ( $t$  ratio  $1.186$ ;  $P = 0.237$ ).

