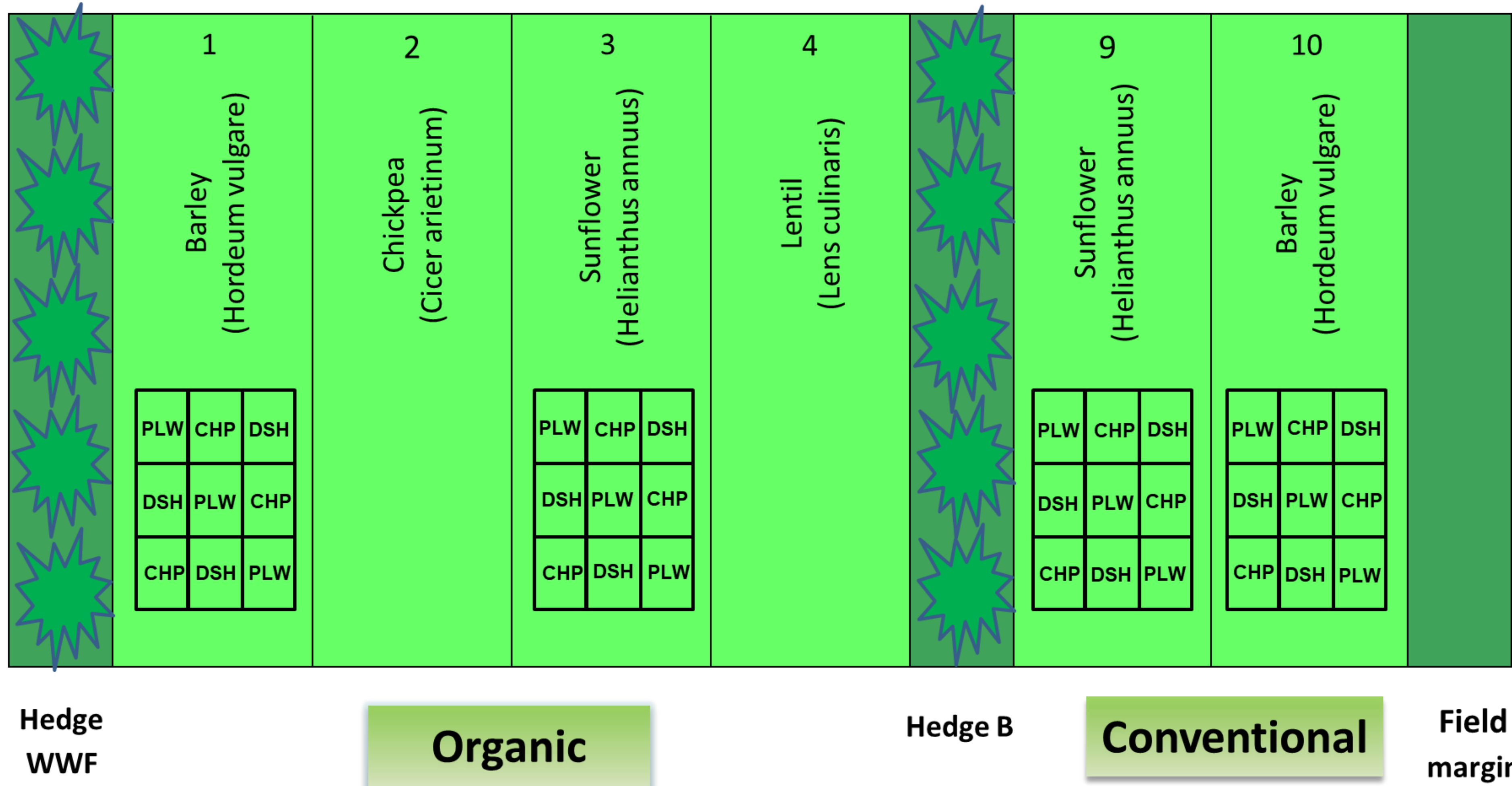


The effect of conservation tillage methods on biodiversity and weed suppression in the Montepaldi Long-Term Experiment (MoLTE)

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PLW: Plowing
CHP: Chisel plowing
DSH: Disk harrowing

Sunflower

Parameter	Organic						Conventional					
	PLW	CHP	DSH	PLW	CHP	DSH	PLW	CHP	DSH	PLW	CHP	DSH
	2016			2017			2016			2017		
Total weed density (n m ⁻²)	68.44	172.9	223.1	72.89	26.67	81.78	18.22	21.78	29.33	39.56	52.89	101.3
Total weed biomass (g m ⁻²)	113.6	106.2	157.0	141.6	168.2	173.5	91.16	77.78	80.09	386.5	227.7	202.5
Species richness	11.67	11.67	14.67	4.00	4.33	7.33	5.33	6.00	8.33	5.33	5.67	7.33
Shannon index	8.52	6.58	7.59	3.09	2.35	4.40	4.41	4.81	6.65	3.29	3.84	3.16
Whittaker index	0.91	0.92	0.91	0.96	0.96	0.94	0.95	0.95	0.93	0.97	0.95	0.95
Sorensen index	0.09	0.08	0.09	0.04	0.04	0.06	0.05	0.05	0.07	0.03	0.05	0.05
Bray Curtis index	0.90	0.91	0.90	0.96	0.96	0.93	0.95	0.94	0.93	0.97	0.95	0.95
Grain yield (t ha ⁻¹)	2.45	2.94	1.58	1.40	1.00	1.13	4.52	3.35	2.68	0.17	0.17	0.40

Barley

Parameter	Organic						Conventional					
	PLW	CHP	DSH	PLW	CHP	DSH	PLW	CHP	DSH	PLW	CHP	DSH
	2016			2017			2016			2017		
Total weed density (n m ⁻²)	89.3	355.6	246.7	73.33	87.11	136.9	118.2	116.4	224.4	463.1	310.7	392.9
Total weed biomass (g m ⁻²)	32.8	93.11	51.56	32.04	182.4	212.8	13.51	10.93	19.07	10.36	17.60	34.84
Species richness	11.6	12.67	12.33	13.67	11.67	11.33	6.00	7.00	8.33	6.33	8.33	9.33
Shannon index	9.31	4.78	5.84	8.76	6.31	8.04	3.60	3.55	3.21	2.93	3.72	4.54
Whittaker index	0.90	0.90	0.90	0.89	0.89	0.89	0.94	0.93	0.92	0.94	0.93	0.92
Sorensen index	0.10	0.10	0.10	0.11	0.11	0.11	0.06	0.07	0.08	0.06	0.07	0.08
Bray Curtis index	0.89	0.88	0.89	0.87	0.88	0.88	0.94	0.92	0.91	0.94	0.92	0.91
Grain yield (t ha ⁻¹)	3.65	3.31	3.25	2.94	2.31	2.18	5.02	4.96	4.96	4.47	4.49	3.94

Main remarks

- Organic systems (Or) showed significantly higher levels of **weed density** as compared to **conventional** (Co) on some of the sunflower tillage-year combinations, while on barley no significant differences were observed. Moreover increasing gradients were reported for some of the **reduced** tillage combinations as compared to those of **ordinary** tillage.
- Organic systems (Or) showed significantly higher levels of **weed biomass** as compared to **conventional** (Co) on some of the barley tillage-year combinations. Furthermore, **ordinary** tillage performed significantly better than **reduced** tillage on barley (2017) as to weed biomass suppression. Apparently, in 2017 chemical weeding on sunflower was not effective.
- Organic systems (Or) performed better than **conventional** (Co) as to **α diversity** (**species richness and Shannon index**) and the **β diversity** (**Whittaker, Sorensen and Bray Curtis index**) on barley (2016 and 2017) and sunflower (2016), in terms of either statistical significance or average gradients.
- This does not apply to sunflower in 2017 due to non-common levels of biodiversity under the organic systems.
- Often **reduced** tillage performed better than **ordinary** tillage in terms of average gradients of α and β biodiversity.
- The **grain yield** was significantly higher in **conventional** systems for both crops, except than for sunflower in 2017 due to a extremely severe drought. **Ordinary** tillage performed better than **reduced** tillage for organic barley and conventional sunflower (2016).