

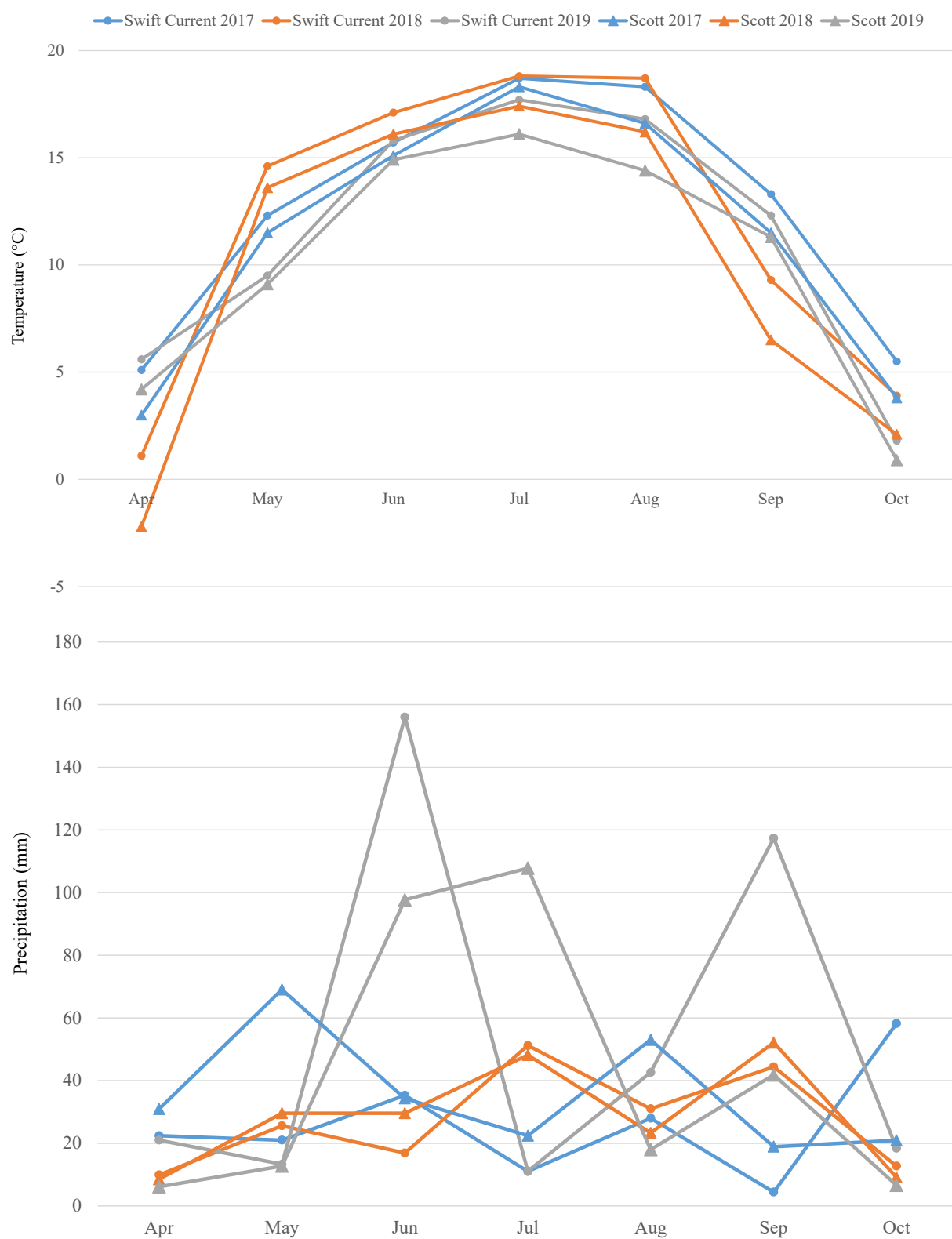


Figure S1. Monthly temperature and precipitation during growing season in 2017-2019.

Table S1. Details of experimental treatments in field.

Treatment	Rolling	Stubble	Disease control	Weed control
1	no-rolling	15cm	fungicide	sprayed
2	no-rolling	15cm	no-fungicide	sprayed
3	rolling after	15cm	fungicide	sprayed
4	rolling after	15cm	no-fungicide	sprayed
5	rolling before	15cm	fungicide	sprayed
6	rolling before	15cm	no-fungicide	sprayed
7	rolling before	15cm	fungicide	no spray
8	rolling before	15cm	no-fungicide	no spray
9	rolling before	0cm	Fungicide	sprayed
10	rolling before	0cm	no-fungicide	no spray

Table S2. ANOVA tests for all main factor effects on tested variables.

locations	Year	Effects	Plant density	lowest pod height (cm)	Plant Height (cm)	Yield (kg/ha)	Seed lost (kg/ha)
Scott	2017	Rolling	0.938	0.944	0.931	0.869	0.012
		Stubble	0.157	0.288	0.547	0.594	0.036
	2018	Rolling	0.827	0.063	0.265	0.511	0.508
		Stubble	0.511	0.282	0.034	0.779	0.499
	2019	Rolling	0.848	0.863	0.427	0.805	0.140
		Stubble	0.307	0.516	0.819	0.413	0.431
Swift	2017	Rolling	0.548	0.317	0.158	0.161	0.982
		Stubble	0.656	0.833	0.912	0.882	0.808
	2018	Rolling	0.973	0.195	0.238	0.439	0.462
		Stubble	0.768	0.008	0.704	0.598	0.422
	2019	Rolling	0.011	0.333	0.824	0.084	0.362
		Stubble	0.488	0.886	0.147	0.834	0.846

Note: Bold number means significant difference at 95% confident level.