

Test Results of Full and Cut Blades

Table S1. Measured force and furrow area of whole / partial disc blades at different settings.

SSweep angle (°)	Tilt angle (°)	Depth (mm)	Draught (N)		Vertical (N)		Side (N)		Furrow area (mm ²)	
			Whole	Partial	Whole	Partial	Whole	Partial	Whole	Partial
5	0	40	210	173	78	57	75	60	1072	819
5	0	80	477	367	120	88	292	237	4067	3707
5	0	60	332	251	114	78	174	131	2513	2401
10	0	60	325	241	75	71	256	234	3493	2926
5	20	60	313	245	118	122	-19	-22	2298	1860
10	20	60	231	177	26	31	130	109	3230	2952

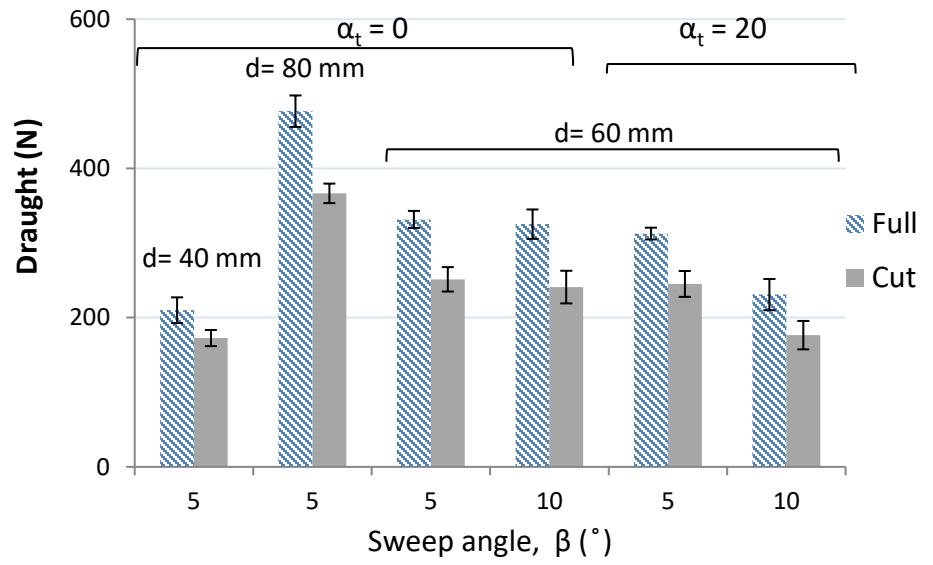


Figure S1. Measured draught force of (Full) whole / partial disc blades at different settings (Note: error bars represent 95% confidence interval of the mean).

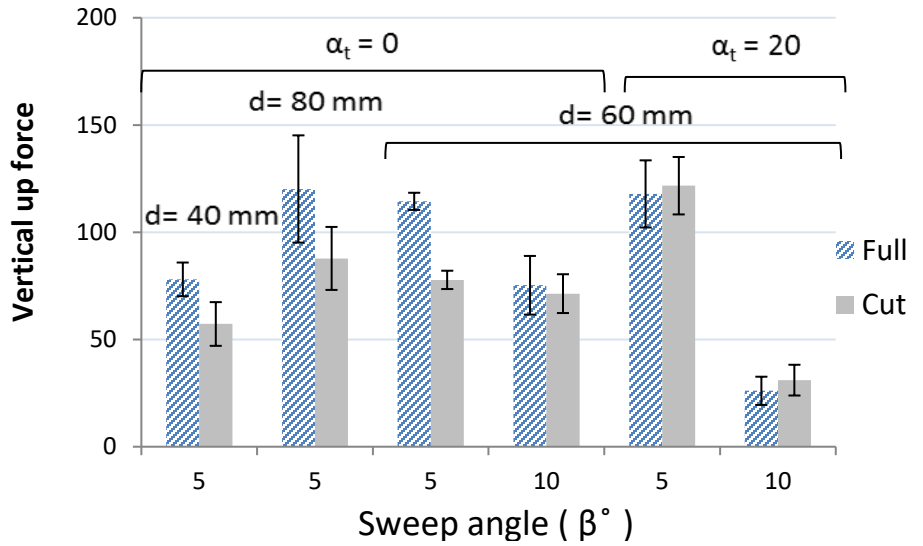


Figure S2. Measured vertical force of whole / partial disc at different settings (Note: error bars represent 95% confidence interval of the mean).

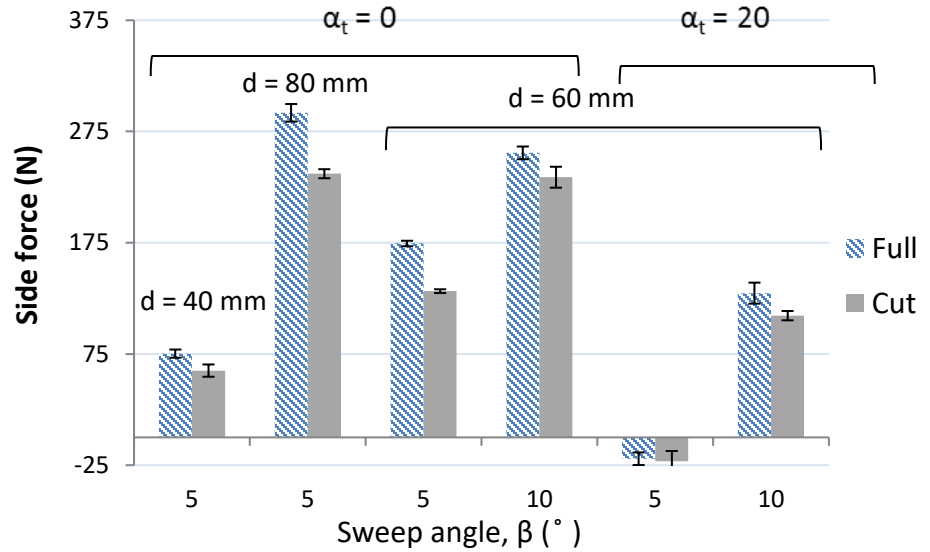


Figure S3. Measured side force of whole / partial (cut) disc at different settings (Note: error bars represent 95% confidence interval of the mean) .

As Figure S4 shows, the furrow area created by the cut-away disc blade was 13.5% smaller than that under the whole disc blade, being significant ($P < 0.05$) on average. This reinforces the previous observations based on soil forces that, while the forward half of the soil-disc interface generates the majority of the soil failure work as anticipated, in practice a slightly greater proportion is involved in achieving the full furrow size.

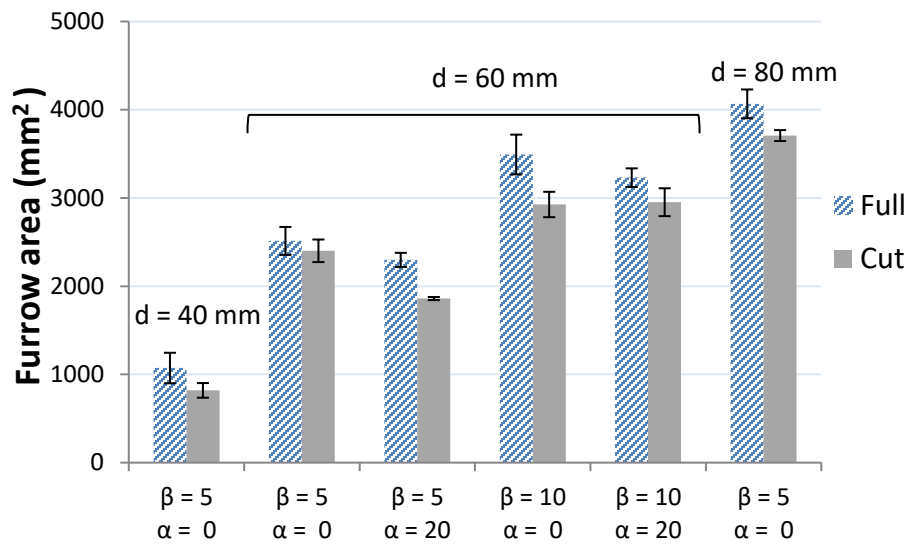


Figure S4. Comparison of furrow area of full and partial disc (error bars represent 95% confidence interval of the mean).