

Supplementary Materials:

Table S1. Baseline results of panicle detection, measured on the refined dataset.

Model	Train	Test	mAP	Precision		Recall		F1-score
EfficientDet-D7	128	128	0.633	0.664		0.761		0.709
EfficientDet-D7	128	256	0.497	0.409	0.536	0.669	0.673	0.545
EfficientDet-D7	128	512	0.096		0.808		0.201	
EfficientDet-D7	256	128	0.363		0.323		0.646	
EfficientDet-D7	256	256	0.398	0.416	0.421	0.462	0.624	0.635
EfficientDet-D7	256	512	0.488		0.642		0.634	
EfficientDet-D7	512	128	0.109	0.252	0.689		0.139	
EfficientDet-D7	512	256	0.339		0.780	0.772	0.385	0.285
EfficientDet-D7	512	512	0.307		0.847		0.332	
Mask R-CNN (Inception ResNet V2)	128	128	0.028		0.114		0.196	
Mask R-CNN (Inception ResNet V2)	128	256	0.241	0.195	0.273	0.249	0.609	0.472
Mask R-CNN (Inception ResNet V2)	128	512	0.317		0.358		0.612	
Mask R-CNN (Inception ResNet V2)	256	128	0.070		0.175		0.205	
Mask R-CNN (Inception ResNet V2)	256	256	0.461	0.345	0.494	0.426	0.643	0.500
Mask R-CNN (Inception ResNet V2)	256	512	0.504		0.610		0.651	
Mask R-CNN (Inception ResNet V2)	512	128	0.064		0.289		0.145	
Mask R-CNN (Inception ResNet V2)	512	256	0.450	0.353	0.565	0.519	0.601	0.461
Mask R-CNN (Inception ResNet V2)	512	512	0.545		0.704		0.637	

Table S2. Baseline results of panicle segmentation, measured on the refined dataset.

Model	Train	Test	mIoU	Precision		Recall	F1-score	
DeepLab v3+	128	128	0.7944		0.805	0.773		0.789
DeepLab v3+	128	256	0.6757	0.663	0.509	0.489	0.687	0.611
DeepLab v3+	128	512	0.5203		0.151		0.373	
DeepLab v3+	256	128	0.8106		0.771		0.792	
DeepLab v3+	256	256	0.7834	0.739	0.771	0.739	0.727	0.610
DeepLab v3+	256	512	0.6228		0.676		0.311	
DeepLab v3+	512	128	0.6993		0.836	0.795	0.441	
DeepLab v3+	512	256	0.6941	0.691	0.805		0.460	
DeepLab v3+	512	512	0.6786		0.743		0.470	
U-Net-ResNet50	128	128	0.6775		0.785		0.519	
U-Net-ResNet50	128	256	0.5944	0.596	0.603	0.558	0.303	
U-Net-ResNet50	128	512	0.5152		0.286		0.111	
U-Net-ResNet50	256	128	0.6988		0.798		0.484	
U-Net-ResNet50	256	256	0.6532	0.636	0.725	0.684	0.415	
U-Net-ResNet50	256	512	0.555		0.5309		0.1707	
U-Net-ResNet50	512	128	0.633		0.796		0.293	
U-Net-ResNet50	512	256	0.618	0.615	0.758	0.761	0.272	
U-Net-ResNet50	512	512	0.592		0.729		0.231	