Supplementary Materials

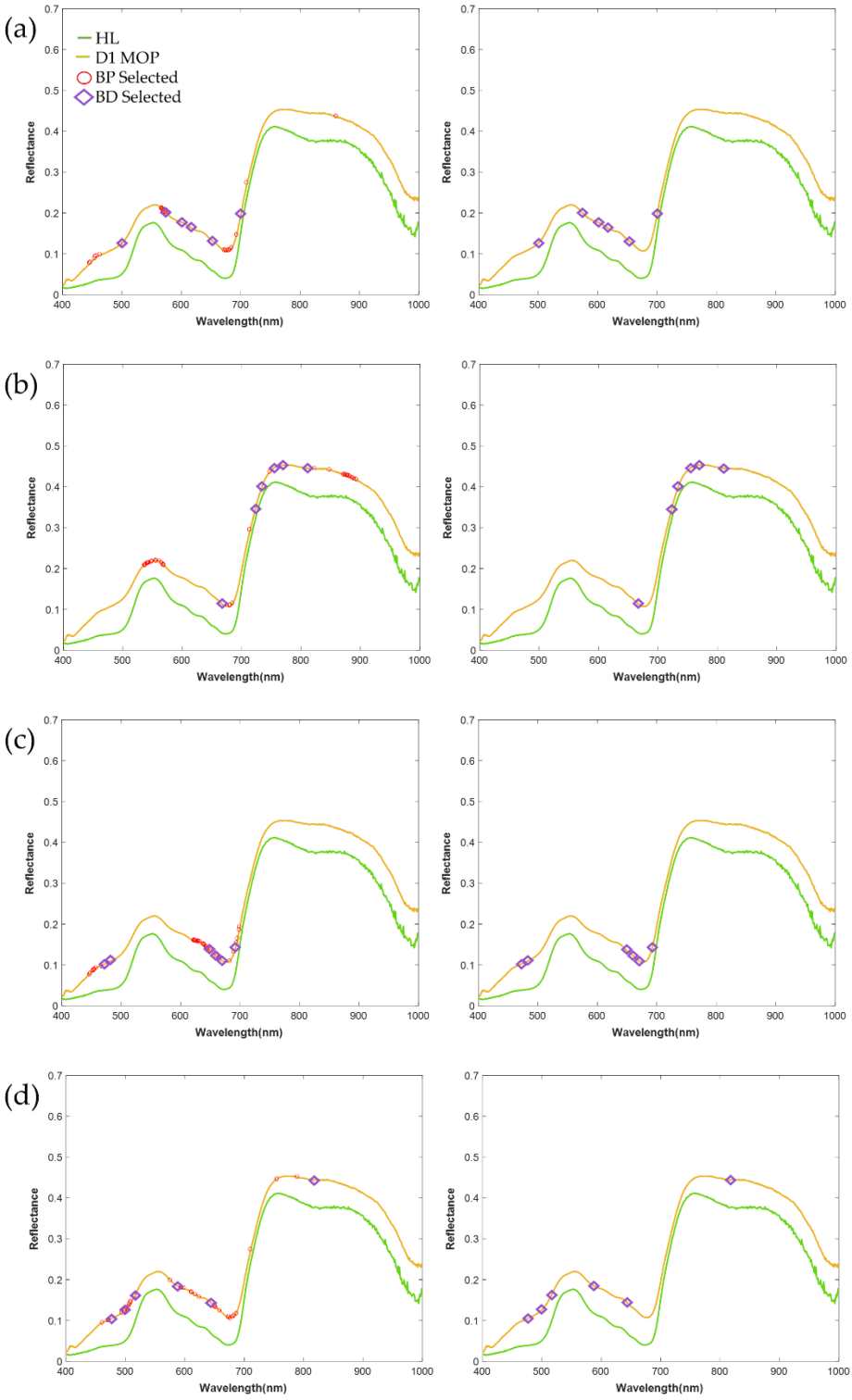

Figure S1. Bands selected through band prioritization and band decorrelation using criteria of (a) Variance, (b) Kurtosis, (c)Skewness and (d) SNR.

(a)

	Ground Truth			
Predict result	973	22	9	96.9%
	22	936	51	92.8%
	5	42	940	95.2%
	97.3%	93.6%	94.0%	95.0%

(b)

	Ground Truth			
Predict result	960	77	15	91.3%
	36	844	134	83.2%
	4	79	851	91.1%
	96.0%	84.4%	85.1%	88.5%

	Ground Truth			
Predict result	970	89	14	90.4%
	24	833	145	83.1%
	6	78	841	90.9%
	97.0%	83.3%	84.1%	88.1%

(c)

	Ground Truth			
Predict result	972	80	13	91.3%
	22	871	122	85.8%
	6	49	865	94.0%
	97.2%	87.1%	86.5%	90.3%

	Ground Truth			
Predict result	971	86	16	90.5%
	26	828	149	82.6%
	3	86	835	90.4%
	97.1%	82.8%	83.5%	87.8%

(d)

	Ground Truth			
Predict result	974	87	26	89.6%
	25	787	109	85.5%
	1	126	865	87.2%
	97.4%	78.7%	86.5%	87.5%

	Ground Truth			
Predict result	963	85	19	90.3%
	32	782	113	84.4%
	5	133	868	86.3%
	96.3%	78.2%	86.8%	87.1%

(e)

	Ground Truth			
Predict result	957	95	30	88.4%
	36	825	154	81.3%
	7	80	816	90.4%
	95.7%	82.5%	81.6%	86.6%

	Ground Truth			
Predict result	966	145	25	85.0%
	30	762	158	80.2%
	4	93	817	89.4%
	96.6%	76.2%	81.7%	84.8%

(f)

	Ground Truth			
Predict result	978	133	26	86.0%
	18	784	185	79.4%
	4	83	789	90.1%
	97.8%	78.4%	78.9%	85.0%

	Ground Truth			
Predict result	969	126	24	86.6%
	26	780	163	80.5%
	5	94	813	89.1%
	96.9%	78.0%	81.3%	85.4%

Figure S2. Confusion Matrix result of DNN model in (a) full bands and band selection (left) and band expansion processes (right) using criteria of, (b) Variance, (c) Entropy, (d) Kurtosis, (e) Skewness and (f) SNR.

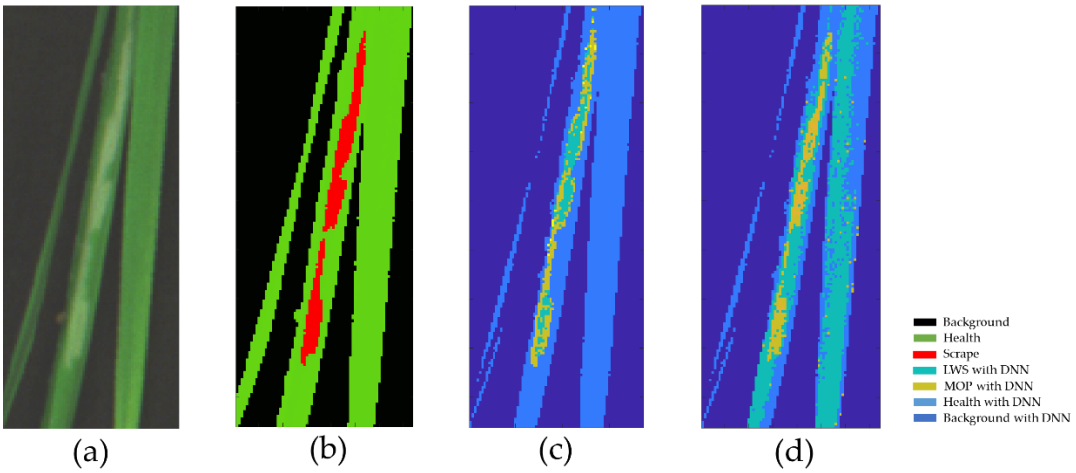

Figure S3. Prediction of spectral information from unknown rice sample: (a) true color image, (b) Ground Truth, (c) CEM _band selection→DNN_ band selection and (d) DNN_ band selection without DNN.

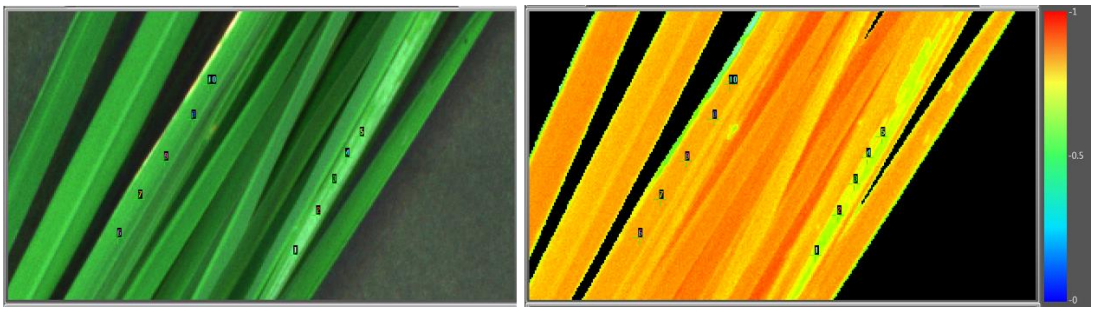

Figure S4. Entoscan Plant imaging system. True color image (left) and NDVI image (right), The color bar is used to assess the growth status of the leaves. The closer the value to 1, the condition is better.

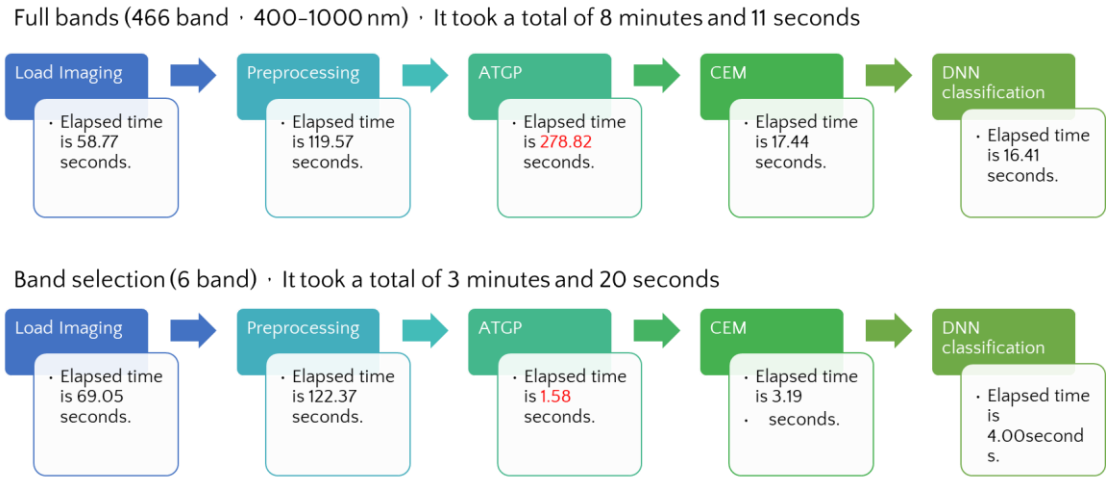

Figure S5. Approximate time required for each step of the prediction of unknown samples.

Table S1. Results of the first six bands of band selection using different criteria.

Criteria	First six wavelengths selected (nm)					
Variance	622	705	603	663	579	504
Entropy	705	603	501	664	489	684
Kurtosis	730	747	778	779	679	812
Skewness	679	663	652	689	467	480
SNR	467	500	530	578	634	810

Table S2. The accuracy of DNN classification evaluated by confusion matrix.

Analysis Method	Pixel number				OA (%)
	TP[2]	FP[3]	TN[4]	FN[5]	
CEM_band selection→DNN_band selection	497	138	11984	109	98.05
DNN_band selection	251	2042	9525	355	76.81