Supplemental files

A Rapid Method for Assessing Seed Drought Resistance Using Integrated ID-BOA-SVM

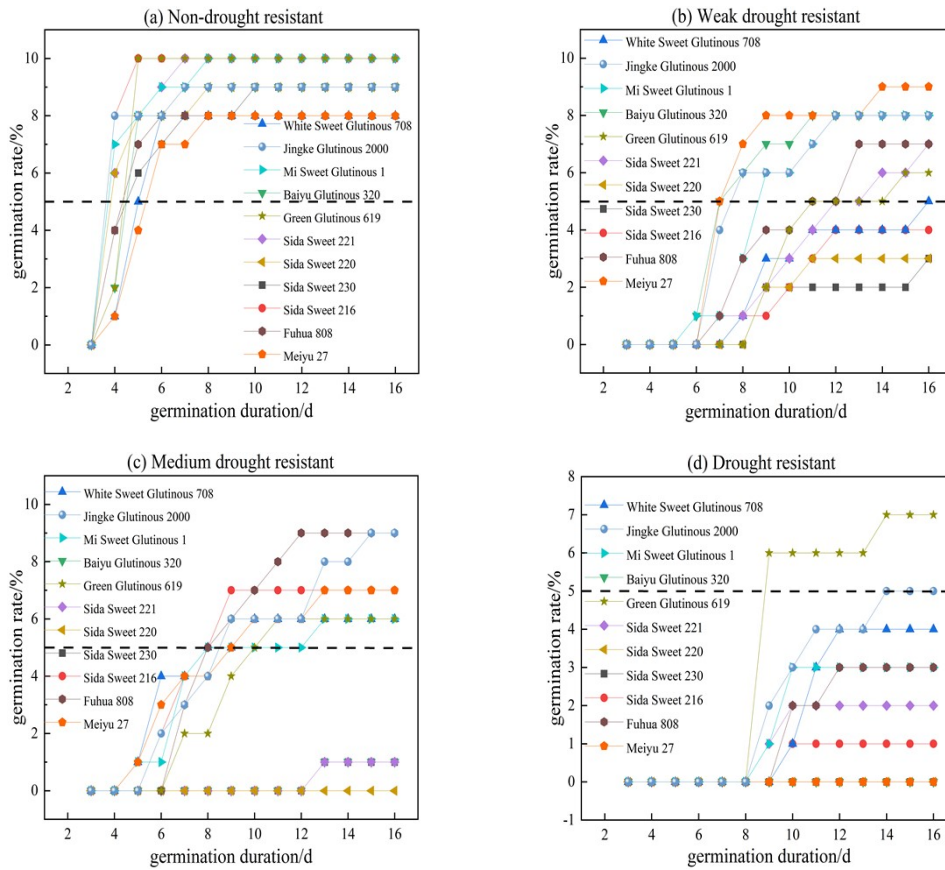Qiaohan Wu, Xiaoyu Zhao*[a], Yue Zhao[a], Lijing Cai[a], Zhe Zhai[b], Liang Tong[c]

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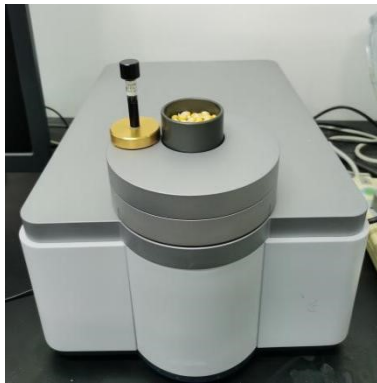
[c]Qiqihar University

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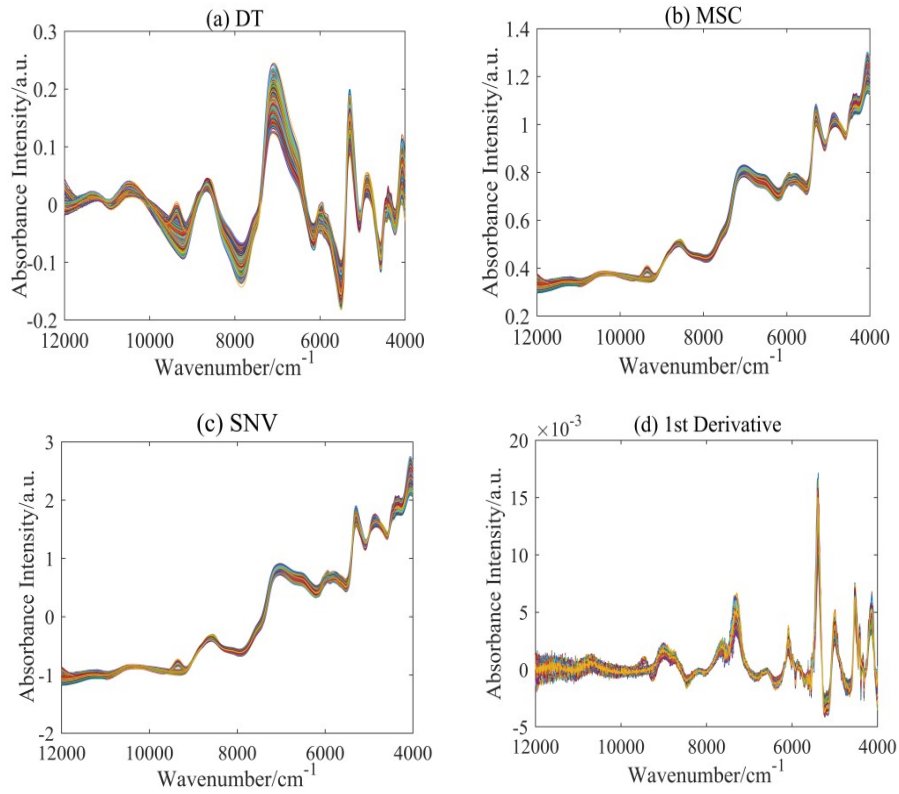Supplementary Fig.1. Germination Rate of Seeds under Different Water Content Resistance

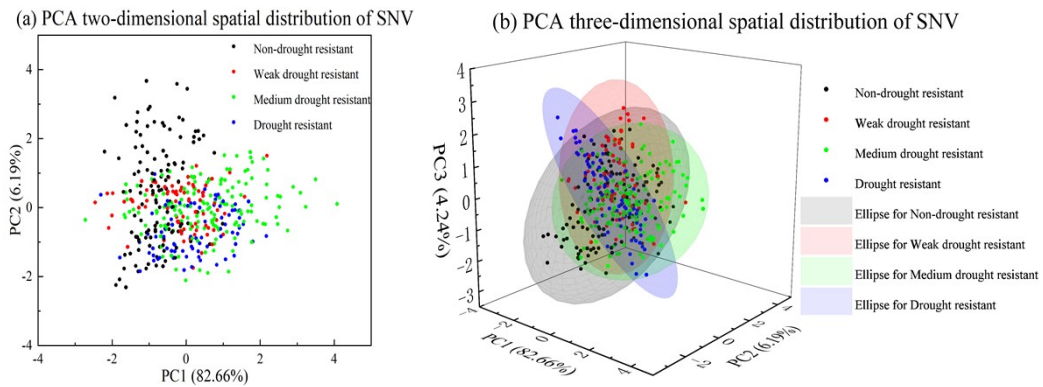Levels: (a) 60-70%, (b) 50-60%, (c) 40-50%, and (d) 30-40%

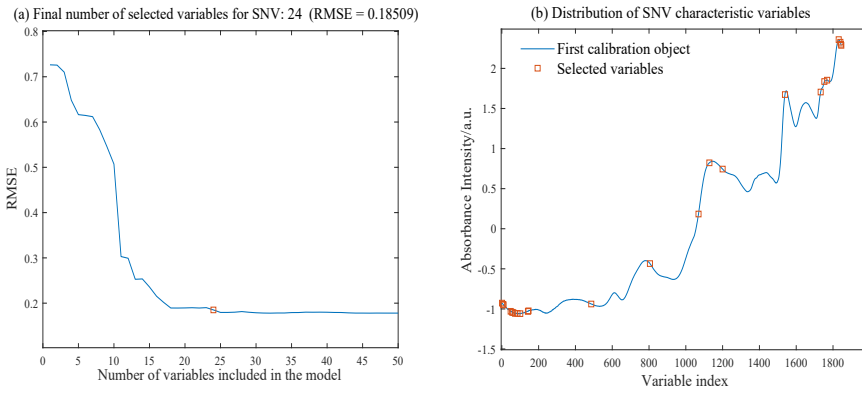Supplementary Fig.2. NIR Spectrometer
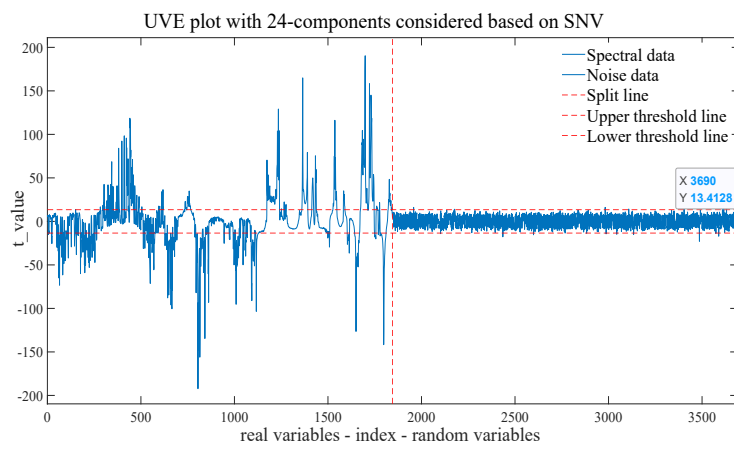

Supplementary Fig.3. Soil Moisture Detector

Supplementary Fig.4. NIR Spectra after Preprocessing: (a) D-Trend, (b) MSC, (c) SNV, and (d)

1st Derivative

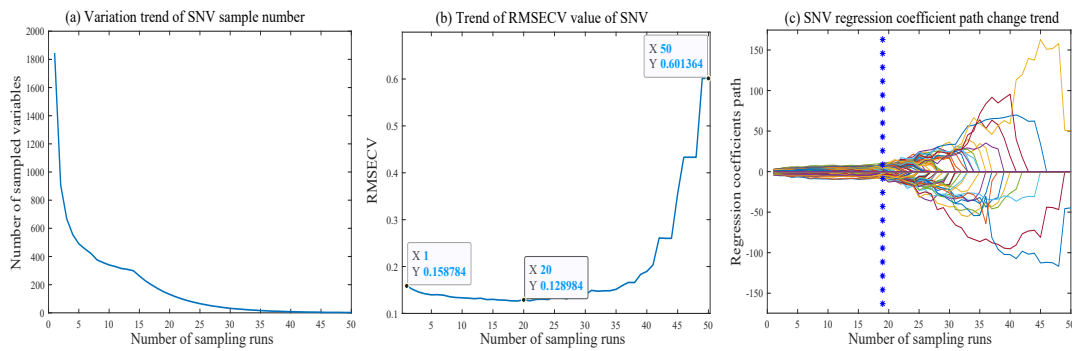Supplementary Fig.5. Two-Dimensional Spatial Distribution of PCA for SNV (a) and Three-

Dimensional Spatial Distribution of PCA for SNV (b)

Supplementary Fig.6. SPA-Based Feature Extraction: RMSE (a) and Features Distribution(b)

Supplementary Fig.7. UVE-Based Feature Extraction

Supplementary Fig.8. CARS-Based Feature Extraction: Number of Sampled Variables (a),

RMSECV (b), and Regression Coefficients Path (c)

Supplementary Table 1: Test Varieties and Traits

Code	Name	Plant height（cm）	Panicle length（cm）	100-seed weight（g）
1	Sida Sweet 230	272	23.3	34.1
2	Sida Sweet 216	236	22.2	35.5
3	White Sweet Glutinous 708	190	19.0	27.6
4	Baiyu Glutinous 320	226	20.8	42.9
5	Sida Sweet 221	251	21.9	33.7
6	Sida Sweet 220	231	21.0	34.2
7	Mi Sweet Glutinous 1	252	20.5	37.2
8	Fuhua 808	286	17.9	35.2
9	Green Glutinous 619	264	20.8	39.5
10	Meiyu 27	217	21.1	37.5
11	Jingke Glutinous 2000	250	19.0	36.1

Supplementary Table 2: Settings Sources of Interference and Parameter Settings

Noise Type	Gaussian Noise	Poisson Noise	1/f Noise	Sinusoidal Baseline
Distribution Function	$p(x)=\dfrac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$ $\mu=0,\ \sigma=0.01$	$P(N_s)=\dfrac{exp(-\lambda)\lambda^{N_s}}{N_s!}$ $\lambda=0.001,\ N_s=1$	$S(f)\propto\dfrac{A}{f^{\beta}}$ $A=0.01,\ \beta=1$	$X(t)=A\sin\ 2\pi ft+\varphi$ $A=0.01,\ f=0.01,\ \varphi=0$
Interference Source	thermal noise white noise light source noise	quantum noise dark current noise scattered noise	current noise	optical device changes environmental vibration