TPM-BX

WHEAT PANICLE SHAPE MEASURING INSTRUMENT

Introduction

TPM-BX is an instrument specifically used in wheat breeding research to detect phenotypic parameters. Plays an important role in wheat variety screening, wheat yield prediction, wheat ear dynamic development, gene localization, and functional analysis in wheat heritage breeding.

Scope of Application

- Suitable periods for detecting wheat ears per mu: wheat heading stage, flowering stage, grain filling stage, and early maturity stage
- The period for wheat ear morphology detection: indoor seed testing period; Wheat angle measurement period: heading stage, flowering stage, grain filling stage, milk ripening stage
- Dry Grain Weight Testing Period: Indoor Seed Testing Period
- Wheat plant height detection period: various growth stages

Features

- Multiple calibration methods for more accurate results: The measurement of wheat ears per mu has a cross calibration object (0.25m2) and a square calibration object (0.5m²)
- A calibration method is used for cross validation of counting results.
- Widely applicable to meet different customer needs: Cross and square calibration objects are suitable for use in wheat planting with sparse and dense conditions, respectively, targeting various wheat planting application scenarios.
- AR assisted photography effectively overcomes blind shooting: When the height of wheat planting is too high, a combination of AR glasses and Bluetooth selfie sticks is used for assisted photography to obtain real-time mobile phone images.
- Efficient batch analysis of wheat ears per mu: It can simultaneously detect and batch analyze the number of ears per mu in 60 photos (≤ 60 photos), and obtain their average value. It can be processed in batches after taking photos.
- It has the functions of occlusion rate, boundary area adjustment, and sensitivity compensation: it measures wheat in the flowering stage, filling stage, and semi mature stage with an error of less than ± 5%, and can zoom the image for viewing and clicking correction to achieve 100% correct ear counting.
- Simultaneous measurement of multiple spikes: 10 wheat spike lengths, spikelet numbers, and average values can be measured at once.
- Black fixed card slot: There is a black card slot on the hardware device to facilitate the fixation of wheat ears and prevent the phenomenon of long wheat ears tipping over.

• Automatic sequence number positioning: The wheat ear sequence number can be automatically located from left to right, and the crop name corresponds one-to-one with the wheat ear sequence number.
• Automatic impurity removal through photo recognition: clear imaging and accurate counting of particles.
• Fast counting speed: It only takes 1 second to identify seeds below 1000.
• Automatic conversion to thousand grain weight: By recognizing the number of seeds and inputting the weight, the thousand grain weight can be automatically converted.
• Integrated connection: The pressure plate and the shaft handle are connected in an integrated manner, which facilitates the fixation of crop stems and reduces the impact of wind and grass movement on crop angle shooting.
• Automatic height recognition: The recognized plant height and ear length data are displayed in the automatic recognition results, and other crop data (such as variety, growth period, etc.) are manually entered to improve crop information.
• Data collection method: Multiple points can be quickly sampled, and data can be analyzed in batches to obtain the average value.
• Scale automatic correction: Any mobile phone can take photos, and the imaging angle can be automatically corrected to avoid distortion errors in photography.
• Intelligent correction: Touch the screen to make corrections, making the results more accurate, up to 100%.
• Data interconnection: The software is embedded in the Zhizhong APP, and lightweight mobile devices are used for data collection and analysis. Efficient real-time interconnection and intercommunication of data among various modules, improving the high degree of data fusion.
• Dynamic encryption: It can be encrypted through a verification code, and one account can be used on multiple phones, but not simultaneously.
• Diversified data viewing: After taking photos for analysis, the results can be viewed, and data reports can also be viewed in the historical records.
• Data export and sharing: Supports data correction, query, editing, and export. Data can be exported in Excel format and shared to WeChat, QQ, or DingTalk for easy viewing of data in multiple application ways.

Technical Parameter

Detection error of wheat ears per mu	⩽ ±5%	Thousand particle weight detection error	±2%
Scope of wheat ear morphology detection	5~20cm	error	Spike length: ± 2%, number of spikelets: ⩽ 3
Range of wheat angle detection	0-180°	Angle measurement error	±5%
Crop stem thickness	0-5.2cm	Crop stem thickness detection error	±1%
Range of plant height detection	0.6-1.5m	measurement error	+1%o

Model Comparison

model	Functional differences
TPM-BX-1	Real time data collection and analysis on mobile devices.
TPM-BX-2	Real time collection and analysis on mobile devices. And equipped with PC software, with cloud platform support, analysis data can be saved to the cloud for viewing anytime and anywhere.

Hardware Configuration

• Cross calibration rod: four ball area calibration support component
• Wheat ear backboard device: black double-sided fine frosted acrylic material device
• Wheat Angle Handheld Device: Portable Mobile Phone Fixed Device
• Wheat plant height calibration pole: portable black mobile calibration pole
• Backlight board: ultra-thin light-emitting board
• Data collector: large color screen mobile phone