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DEVELOPMENT OF BIG DATA PLATFORM FOR DUS EXAMINATION

Document prepared by an expert from China

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The annex to this document contains a copy of a presentation “Development of big data platform for DUS examination”, to be made by an expert from China, at the third session of the TWM.

[Annex follows]



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DEVELOPMENT OF BIG DATA PLATFORM FOR DUS EXAMINATION

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TWM3, Beijing, April 28 to May 1, 2025

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2. Current development
3. Future plan

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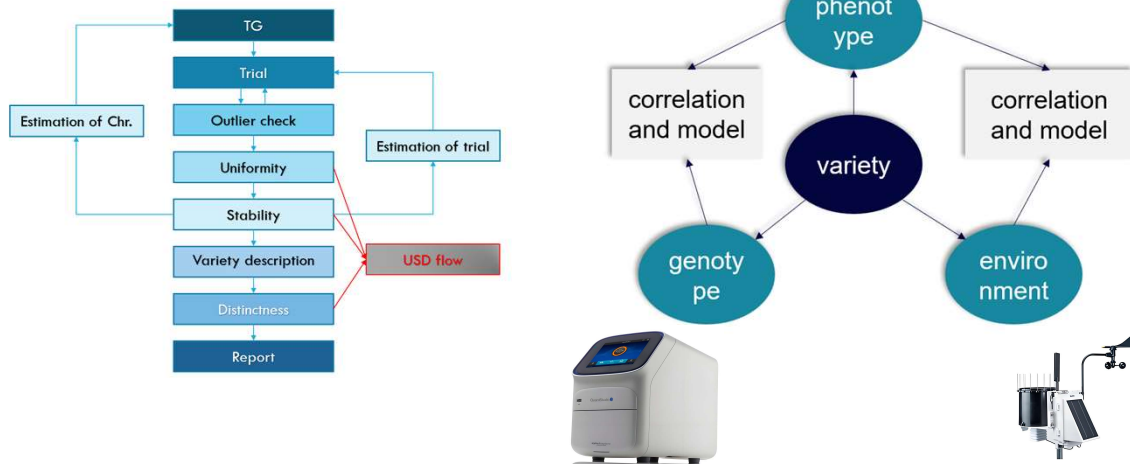
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1.1 PROBLEMS IN DUS TESTING

- ① Personnel errors and environmental errors.
- ② Low efficiency of data collection and analysis.
- ③ Low linear correlation between molecular distance and morphological distance.
- ④ Imperfection of minimum distance of D, U and S.

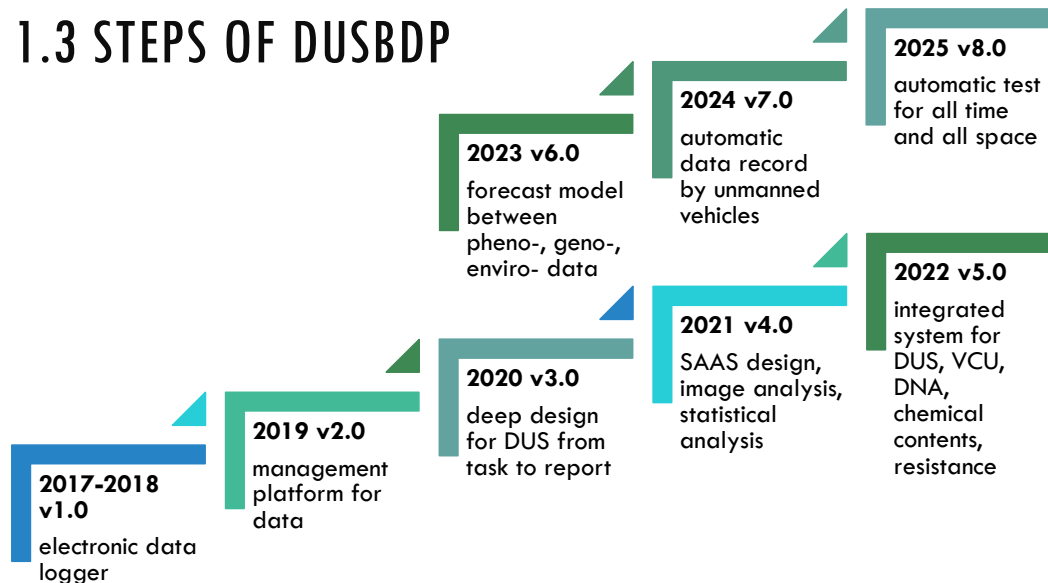
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1.2 STRUCTURE OF DUSBDP



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1.3 STEPS OF DUSBDP



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1.4 HISTORY OF DUSBDP

1. 2017 We developed a datalogger which is prototype of DUSBDP.
2. 2021 We reported DUSBDP4.0 in TWC39.
3. 2023 We reported DUSBDP5.5 in TWO55.
4. 2024 We abandoned old platform and built a new one for better analysis module.

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2.1 DATA MANAGEMENT PLATFORM AND LOGGER APP



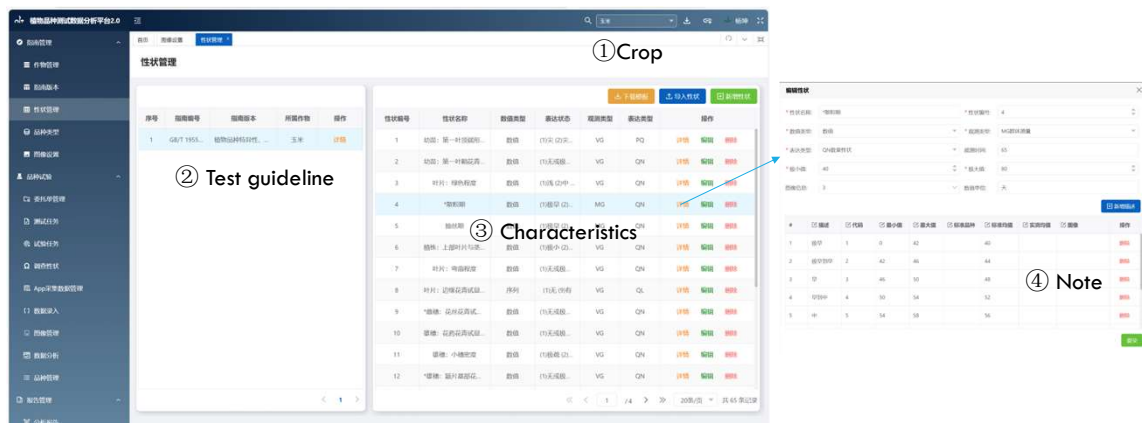
Data management platform



Data logger APP

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2.2 MANAGEMENT OF TG PARAMETERS



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2.3 MANAGEMENT OF IMAGE TYPES

图像设置

| 序号 | 作物名称 | 图像编号 | 描述 | 是否应用于报告 | 图像类别 | 操作 |
|----|------|------|------|-------------------------------------|------|-------|
| 1 | 玉米 | 1 | 幼苗 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 2 | 玉米 | 2 | 抽穗 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 3 | 玉米 | 3 | 花序 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 4 | 玉米 | 4 | 雄穗 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 5 | 玉米 | 5 | 花药 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 6 | 玉米 | 6 | 雄穗 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 7 | 玉米 | 7 | 新体果穗 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 8 | 玉米 | 8 | 小穴洞 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 9 | 玉米 | 9 | 雄花 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 10 | 玉米 | 10 | 籽粒 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 11 | 玉米 | 11 | 中心轴 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 12 | 玉米 | 12 | 横断面 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |
| 13 | 玉米 | 100 | 分枝果穗 | <input checked="" type="checkbox"/> | 查看照片 | 编辑 删除 |

Image without
algorithm



Image with
algorithm



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2.4 DATA MANAGEMENT

数据录入

| 试验任务 | 操作 | 类型 | 品种 | 测试编号 | 试验 | 试验类型 | 总株数 | 种植株数 | 1 | 2 | 3 |
|--------------------|----|----|---------|--------------|------|------|-----|------|---|---|---|
| 2014年上海农科院玉米制种试验 | 详情 | 标准 | CA11912 | 20237000108Z | 2023 | 1 | 128 | 0 | 3 | 3 | 2 |
| 2014年上海农科院制种玉米性状试验 | 详情 | 申请 | C20178 | 20225010304A | 2023 | 1 | 128 | 0 | 3 | 3 | 2 |
| 2014年上海农科院文都制种性状试验 | 详情 | 申请 | C21962 | 20225010306A | 2023 | 1 | 128 | 0 | 2 | 2 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | C22614 | 20225010302A | 2023 | 1 | 128 | 0 | 2 | 3 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | C24726 | 20225010303A | 2023 | 1 | 128 | 0 | 2 | 3 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | C27729 | 20225010305A | 2023 | 1 | 128 | 0 | 3 | 3 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | DK223 | 20235010347A | 2023 | 1 | 128 | 0 | 4 | 5 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | DK226 | 20235010348A | 2023 | 1 | 128 | 0 | 4 | 5 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | DK228 | 20235010345A | 2023 | 1 | 128 | 0 | 4 | 3 | 2 |
| 2021年玉米杂交种试验 | 详情 | 申请 | DS2301 | 20235010209A | 2023 | 1 | 128 | 0 | 4 | 5 | 2 |
| 2020年玉米杂交种试验 | 详情 | 申请 | DS2302 | 20235010208A | 2023 | 1 | 128 | 0 | 4 | 5 | 2 |
| 2019年玉米杂交种试验 | 详情 | 申请 | DS2304 | 20235010210A | 2023 | 1 | 128 | 0 | 4 | 3 | 2 |

Data from Excel

Data from APP

数据录入

数据编号: ym350

类型: 申请

总株数: 128

种植株数: 0

1: 4

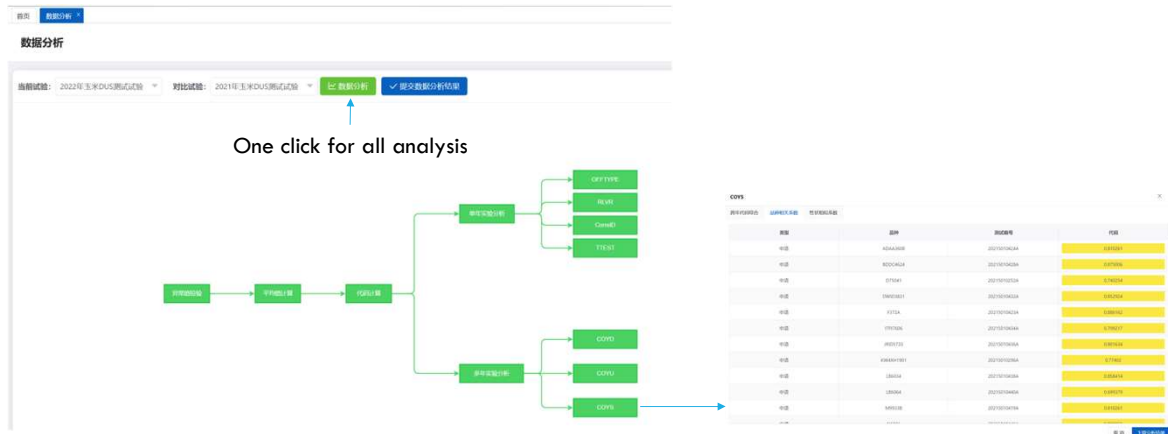
2: 5

3: 2

保存并继续

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2.5 DATA ANALYSIS



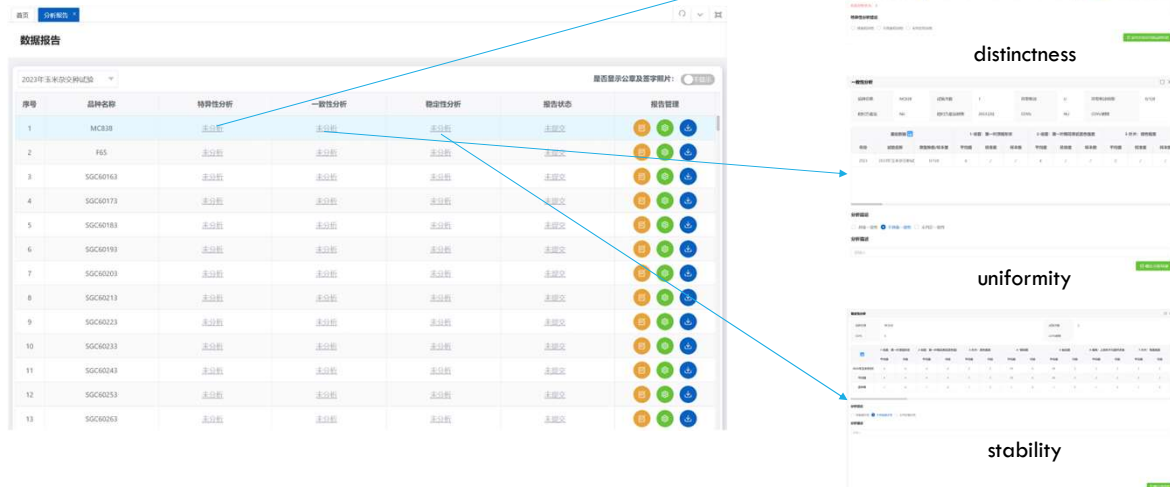
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2.6 IMAGE MANAGEMENT AND ANALYSIS

The screenshot shows a software interface for image management and analysis. On the left, there is a list of images with columns: '试验编号', '试验名称', '试验地点', '试验时间', '试验结果'. The list contains several rows of data. In the center, there is a section titled '数据从图像' (Data from image) with a blue arrow pointing to a table. The table has columns: '试验编号', '试验名称', '试验地点', '试验时间', '试验结果'. The table contains several rows of data. On the right, there is a photograph of five ears of corn, numbered 1 to 5, with a color calibration chart to the left.

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2.7 DUS REPORT



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3.1 ADVANTAGES

- ① One-click data analysis with several checks generates perfect reports for a trial.
- ② Images play an increasingly important role in DUS testing.
- ③ We have more time to seek secrets in data.

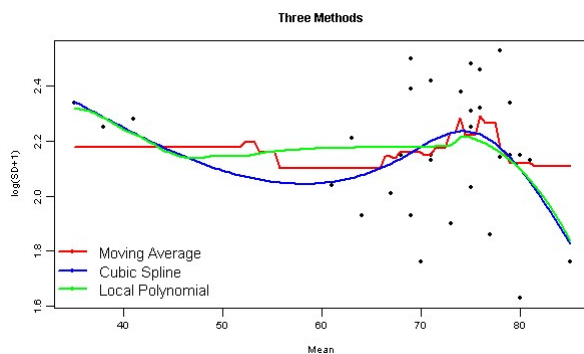
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3.2 SHORTCOMINGS

- ① There are a lot of gaps between our platform and commercial software or hardware.
- ② We need time to move molecular data and environmental data from old platform to new platform.
- ③ We need time to develop algorithms for correlation analysis between morphological data, genotypic data and environmental data.

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3.3 OPTIMISM ABOUT THE FUTURE




Mathematic improvement





AI in image analysis

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THANK YOU FOR YOUR ATTENTION!

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