

Technical Working Party on Testing Methods and Techniques

TWM/3/19

**Third Session
Beijing, China, April 28 to May 1, 2025**

Original: English
Date: April 9, 2025

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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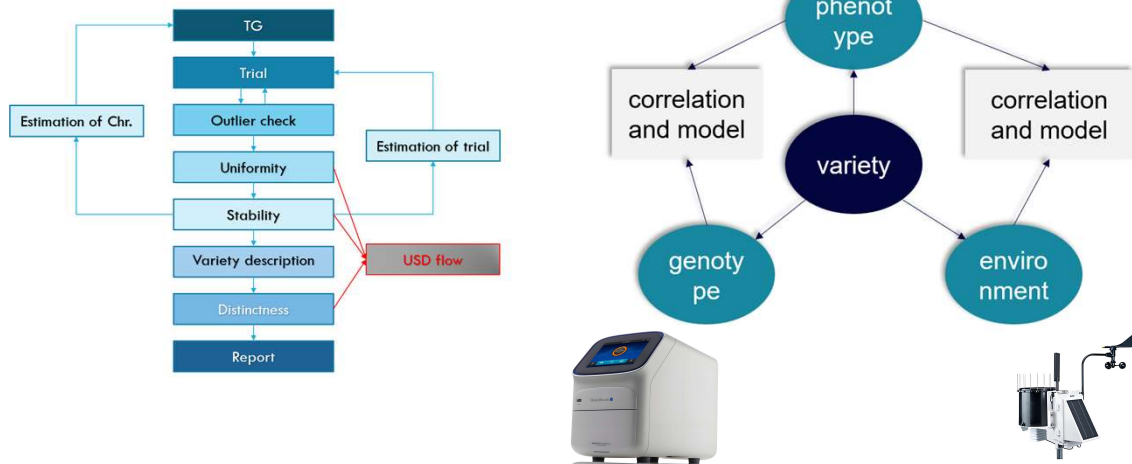
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1.1 PROBLEMS IN DUS TESTING

- 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.

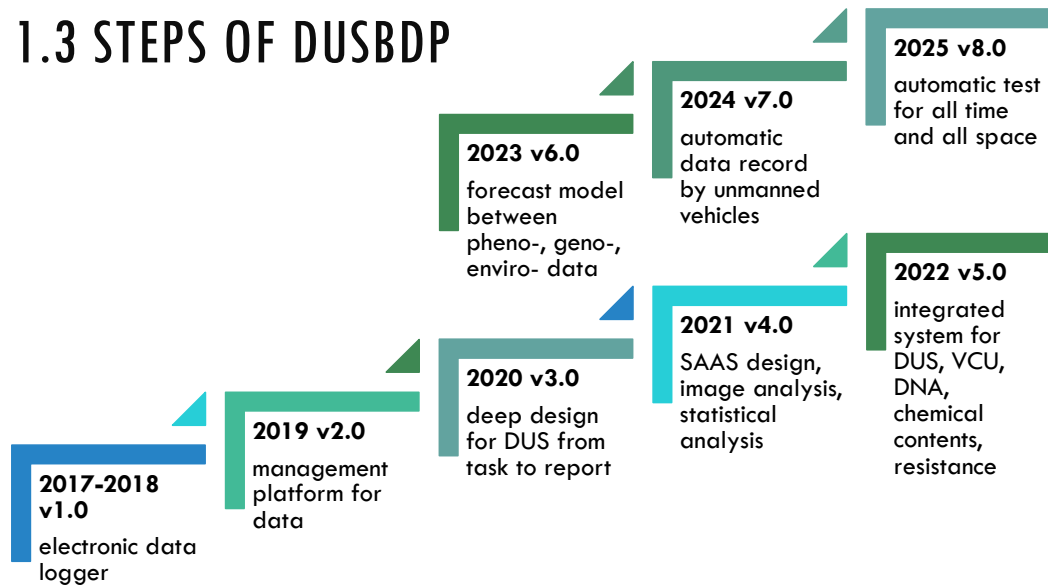
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1.2 STRUCTURE OF DUSBDP



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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

① Crop

② Test guideline

③ Characteristics

④ Note

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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 | 横截面 | <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 | 20225010347A | 2023 | 1 | 128 | 0 | 4 | 5 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | DK226 | 20225010348A | 2023 | 1 | 128 | 0 | 4 | 5 | 2 |
| 2022年玉米杂交种试验 | 详情 | 申请 | DK228 | 20225010345A | 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 (已选) 标准 (禁用)

总株数: 128

种植株数: 0

1: 12 (已选) 14 (禁用) 16 (禁用) 18 (禁用)

2: 14 (已选) 16 (禁用) 18 (禁用)

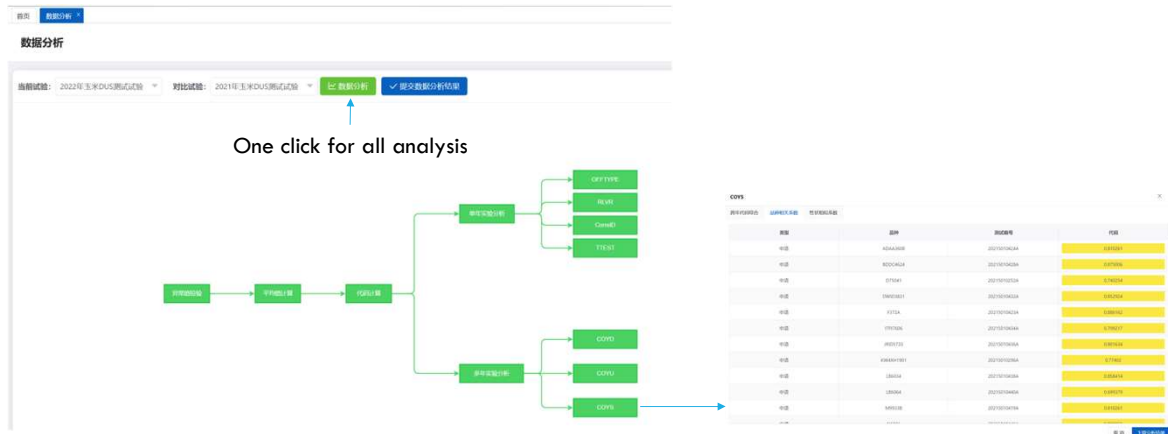
3: 18 (已选) 20 (禁用) 22 (禁用)

保存并继续

上一任务

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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 '名称' (Name) and '日期' (Date). The main area shows a detailed view of a corn image. A red circle highlights the '数据' (Data) tab, with a blue arrow pointing to the text 'Data from image'. Below the image, there is a table with columns 'ID', '名称', '日期', '长度', '直径', '重量', '颜色', '面积', '周长', '圆度', '椭圆度', '偏心率', '重心', '质心', '惯性矩', '重心矩', '重心积矩', '重心积矩', '重心积矩', '重心积矩'. The table contains 10 rows of data, with the first row highlighted in yellow.

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2.7 DUS REPORT

| 数据报告 | | 是否显示公章及签字图片: <input type="checkbox"/> | | | | |
|--------------|----------|---------------------------------------|-------|-------|------|---|
| 2023年玉米验收测试站 | | | | | | |
| 序号 | 品种名称 | 特性性分析 | 一致性分析 | 稳定性分析 | 报告状态 | 报告管理 |
| 1 | MC308 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 2 | F65 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 3 | SGC60163 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 4 | SGC60173 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 5 | SGC60181 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 6 | SGC60199 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 7 | SGC60201 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 8 | SGC60213 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 9 | SGC60223 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 10 | SGC60233 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 11 | SGC60243 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 12 | SGC60253 | 未分析 | 未分析 | 未分析 | 未提交 |    |
| 13 | SGC60263 | 未分析 | 未分析 | 未分析 | 未提交 |    |

| distinctness | | | | | | | | | | | |
|--------------|------------------------|-------------|----------|---------------------|---------------------|----------|---------|--------|---------------------|---------------------|----------|
| job | job name | hostname | username | starttime | endtime | duration | status | reason | start time | end time | duration |
| 1 | job1: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:00:00 | 2022-02-01 10:00:00 | 00:00:00 | success | | 2022-02-01 10:00:00 | 2022-02-01 10:00:00 | 00:00:00 |
| 2 | job2: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:01:00 | 2022-02-01 10:01:00 | 00:00:00 | success | | 2022-02-01 10:01:00 | 2022-02-01 10:01:00 | 00:00:00 |
| 3 | job3: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:02:00 | 2022-02-01 10:02:00 | 00:00:00 | success | | 2022-02-01 10:02:00 | 2022-02-01 10:02:00 | 00:00:00 |
| 4 | job4: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:03:00 | 2022-02-01 10:03:00 | 00:00:00 | success | | 2022-02-01 10:03:00 | 2022-02-01 10:03:00 | 00:00:00 |
| 5 | job5: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:04:00 | 2022-02-01 10:04:00 | 00:00:00 | success | | 2022-02-01 10:04:00 | 2022-02-01 10:04:00 | 00:00:00 |
| 6 | job6: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:05:00 | 2022-02-01 10:05:00 | 00:00:00 | success | | 2022-02-01 10:05:00 | 2022-02-01 10:05:00 | 00:00:00 |
| 7 | job7: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:06:00 | 2022-02-01 10:06:00 | 00:00:00 | success | | 2022-02-01 10:06:00 | 2022-02-01 10:06:00 | 00:00:00 |
| 8 | job8: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:07:00 | 2022-02-01 10:07:00 | 00:00:00 | success | | 2022-02-01 10:07:00 | 2022-02-01 10:07:00 | 00:00:00 |
| 9 | job9: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:08:00 | 2022-02-01 10:08:00 | 00:00:00 | success | | 2022-02-01 10:08:00 | 2022-02-01 10:08:00 | 00:00:00 |
| 10 | job10: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:09:00 | 2022-02-01 10:09:00 | 00:00:00 | success | | 2022-02-01 10:09:00 | 2022-02-01 10:09:00 | 00:00:00 |
| 11 | job11: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:10:00 | 2022-02-01 10:10:00 | 00:00:00 | success | | 2022-02-01 10:10:00 | 2022-02-01 10:10:00 | 00:00:00 |
| 12 | job12: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:11:00 | 2022-02-01 10:11:00 | 00:00:00 | success | | 2022-02-01 10:11:00 | 2022-02-01 10:11:00 | 00:00:00 |
| 13 | job13: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:12:00 | 2022-02-01 10:12:00 | 00:00:00 | success | | 2022-02-01 10:12:00 | 2022-02-01 10:12:00 | 00:00:00 |
| 14 | job14: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:13:00 | 2022-02-01 10:13:00 | 00:00:00 | success | | 2022-02-01 10:13:00 | 2022-02-01 10:13:00 | 00:00:00 |
| 15 | job15: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:14:00 | 2022-02-01 10:14:00 | 00:00:00 | success | | 2022-02-01 10:14:00 | 2022-02-01 10:14:00 | 00:00:00 |
| 16 | job16: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:15:00 | 2022-02-01 10:15:00 | 00:00:00 | success | | 2022-02-01 10:15:00 | 2022-02-01 10:15:00 | 00:00:00 |
| 17 | job17: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:16:00 | 2022-02-01 10:16:00 | 00:00:00 | success | | 2022-02-01 10:16:00 | 2022-02-01 10:16:00 | 00:00:00 |
| 18 | job18: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:17:00 | 2022-02-01 10:17:00 | 00:00:00 | success | | 2022-02-01 10:17:00 | 2022-02-01 10:17:00 | 00:00:00 |
| 19 | job19: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:18:00 | 2022-02-01 10:18:00 | 00:00:00 | success | | 2022-02-01 10:18:00 | 2022-02-01 10:18:00 | 00:00:00 |
| 20 | job20: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:19:00 | 2022-02-01 10:19:00 | 00:00:00 | success | | 2022-02-01 10:19:00 | 2022-02-01 10:19:00 | 00:00:00 |
| 21 | job21: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:20:00 | 2022-02-01 10:20:00 | 00:00:00 | success | | 2022-02-01 10:20:00 | 2022-02-01 10:20:00 | 00:00:00 |
| 22 | job22: 测试 distinctness | 10.10.10.10 | root | 2022-02-01 10:21:00 | 2022-02-01 10:21:00 | 00:00:00 | success | | 2022-02-01 10:21:00 | 2022-02-01 10:21:00 | 00:00:00 |

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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.

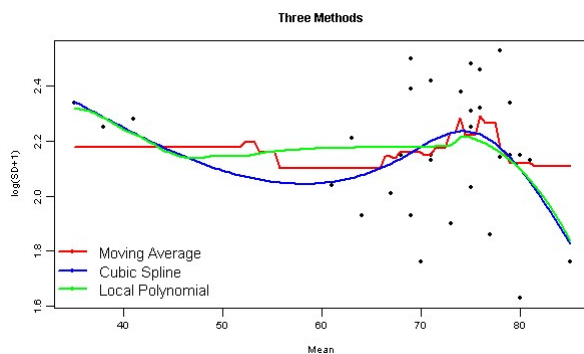
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3.2 SHORTCOMINGS

- 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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