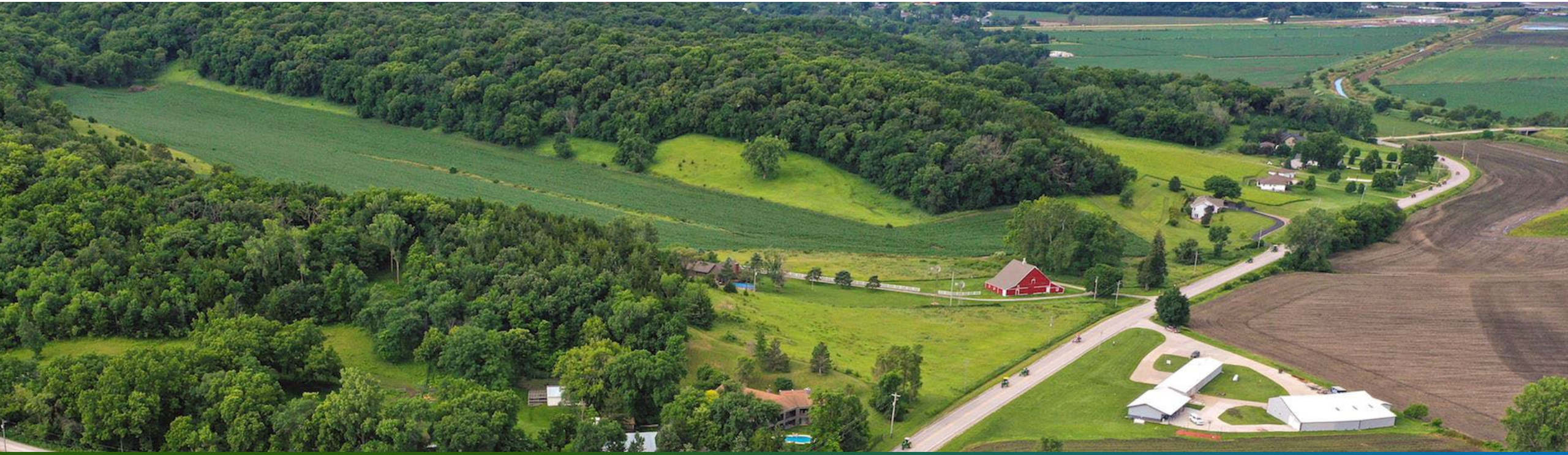
USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE



AMS Federal Grain Inspection Service

Technology and Science Division

TSD Capacity and Capabilities

- **Core programs: mandated activities.**
- **Direct service: customer requested activities.**
- ***Oversee integrity of grain inspection system.***

Protein and Oil Calibration Verification

Inspection Instrumentation Branch

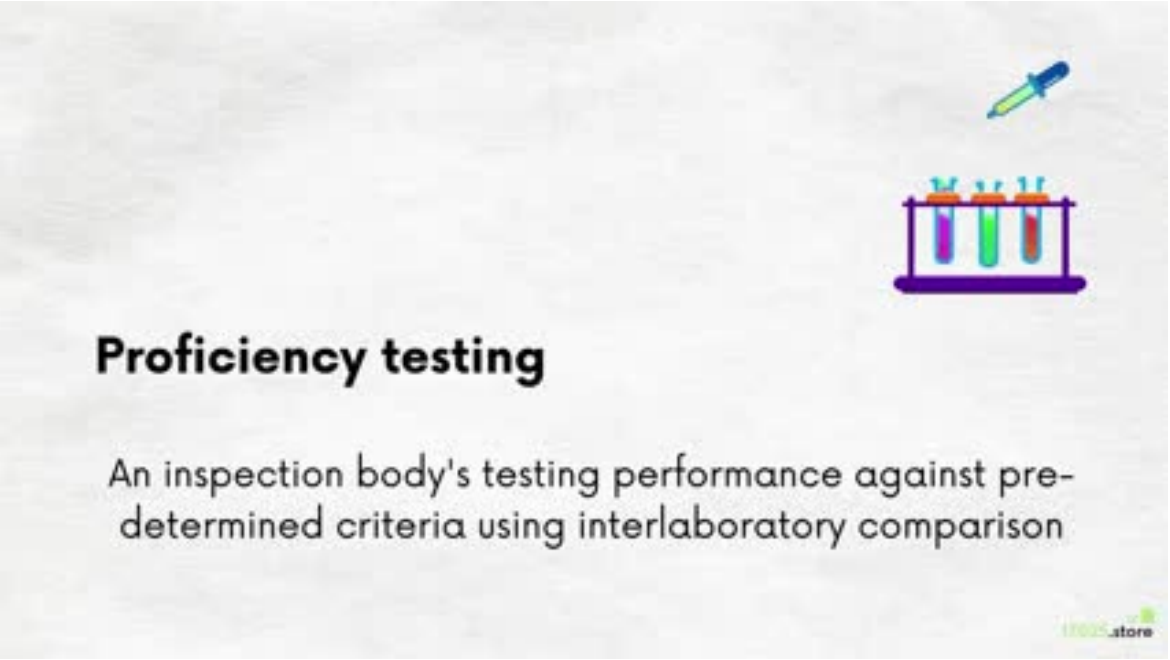
- Collects and organizes representative samples throughout the US
- Analyzes whole grain samples on Moisture meters, NMR, and NIR instruments for:
  - Moisture
  - Protein
  - Oil

Reference Labs

- Analyzes ground portions of the same samples
- Utilizes official reference methods
  - Moisture
  - Protein
  - Oil
- Results reported to IIB to verify/update instrument calibrations

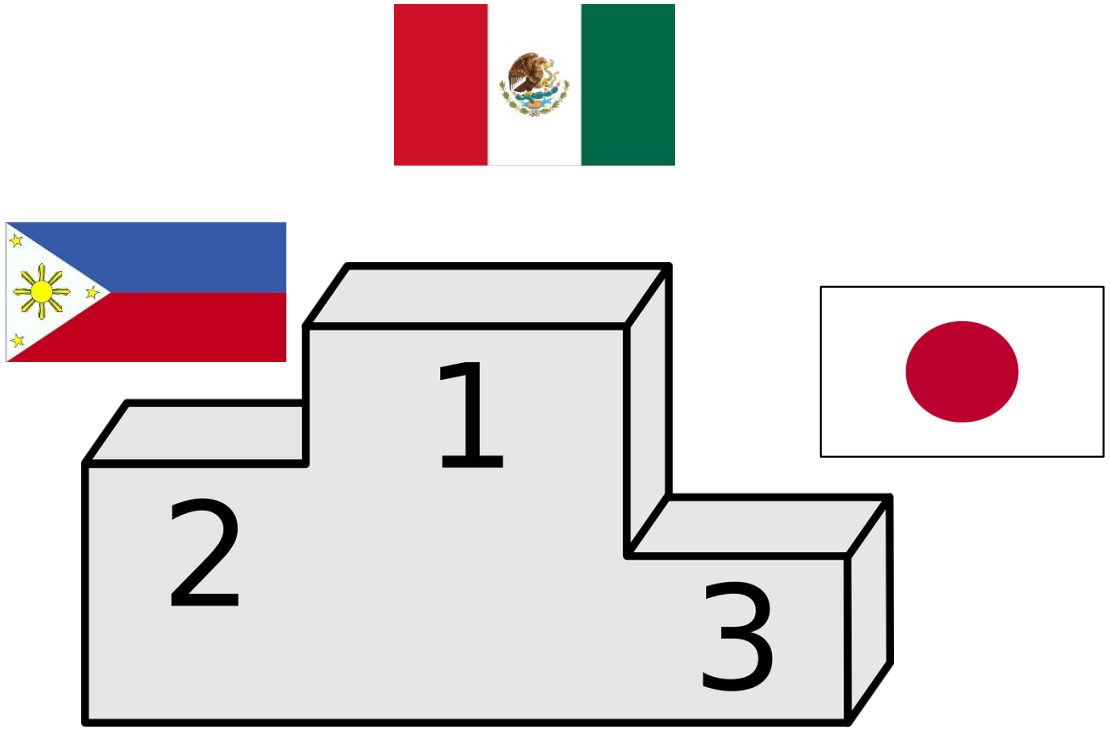
National Mycotoxin QA

- **Draft directive completed**
- **Focus on monitoring and proficiency testing**



U.S. Wheat Exports to Japan

Fiscal Year	WHEAT MT to Japan	Total Metric Tons	Japan % of total
2024	1,996,395	21,053,457	9.5%
2023	1,888,174	17,435,427	10.8%
2022	2,210,889	19,953,065	11.1%
2021	2,423,933	24,566,396	9.9%
2020	2,721,095	26,437,160	10.3%
2019	2,462,258	26,337,353	9.3%
2018	2,670,867	20,862,341	12.8%
2017	3,149,903	27,402,085	11.5%
2016	2,511,424	22,555,498	11.1%
2015	2,667,950	21,270,332	12.5%
2014	3,025,255	26,883,009	11.3%
		10 year average	**10.9%**

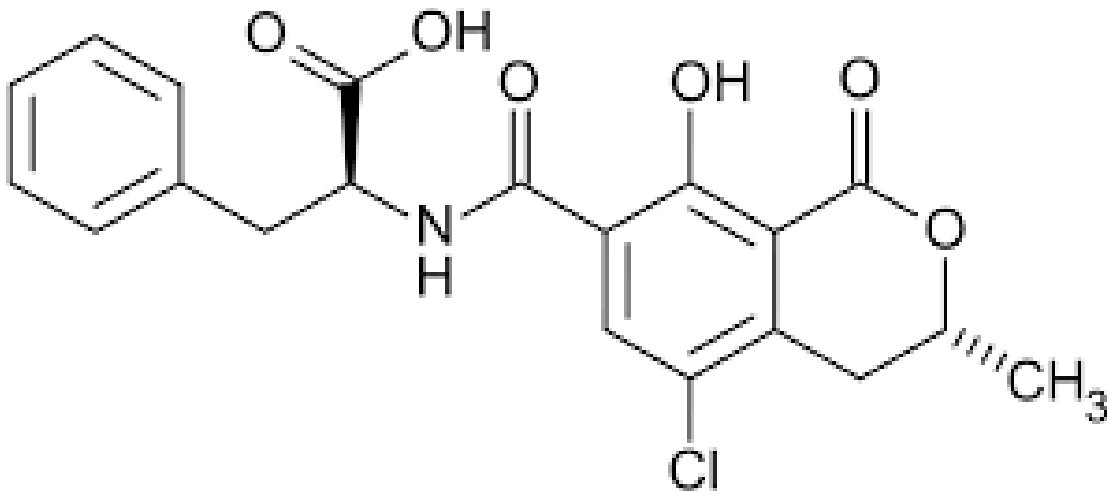


Ochratoxin A

- 5 ppb limit for import.
- Need a test kit that can quantify down to 2ppb for export.

MAFF
Ministry of Agriculture, Forestry and Fisheries
農林水産省

Ochratoxin A



- Solicited manufacturers
- Preliminary evaluation
- Fit for purpose
- Establish criteria other manufacturers can submit kits for eval.


HOW do we get there?
WHERE
HOW
Where are you NOW?
WHERE will we be in the future?
NOW

Grain VALUE™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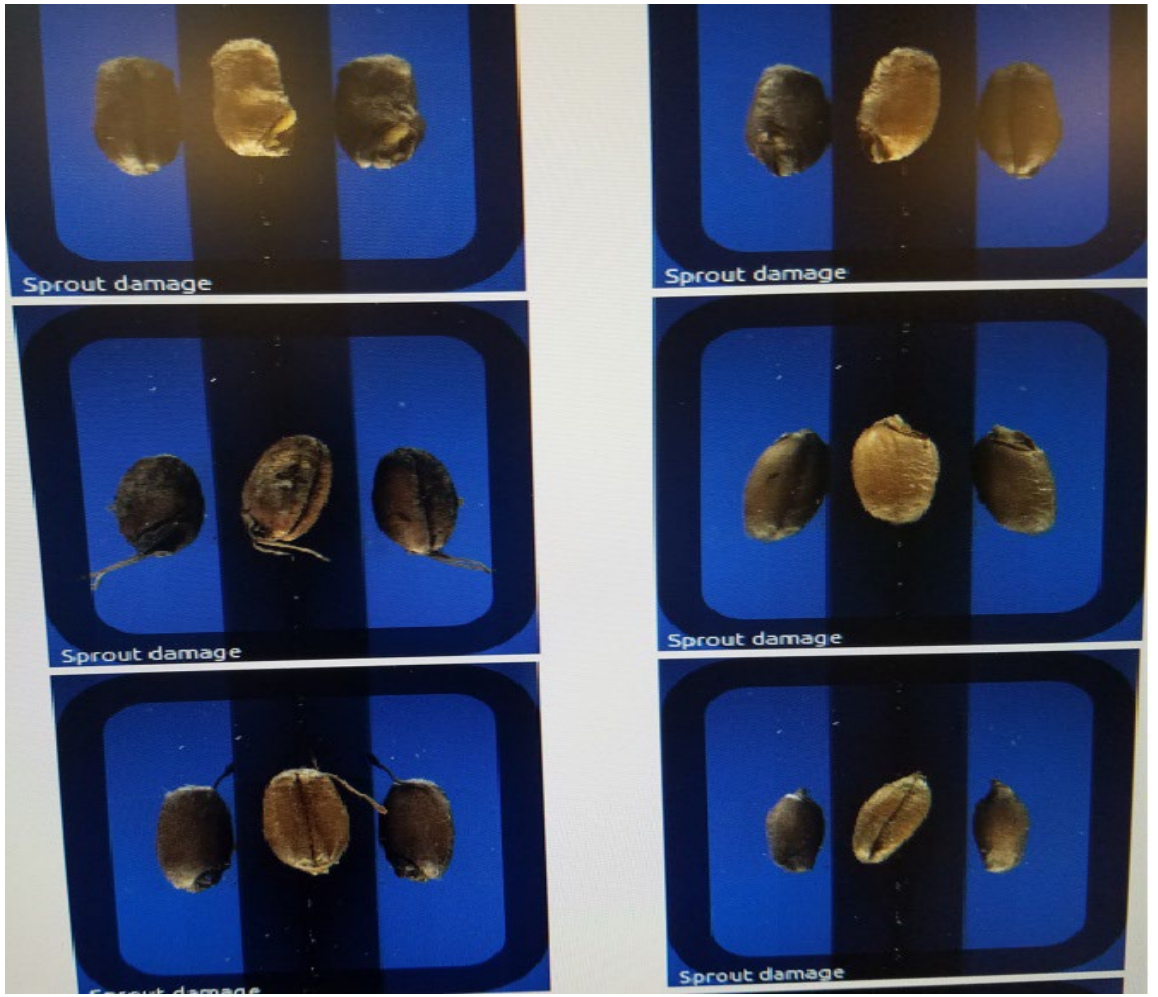
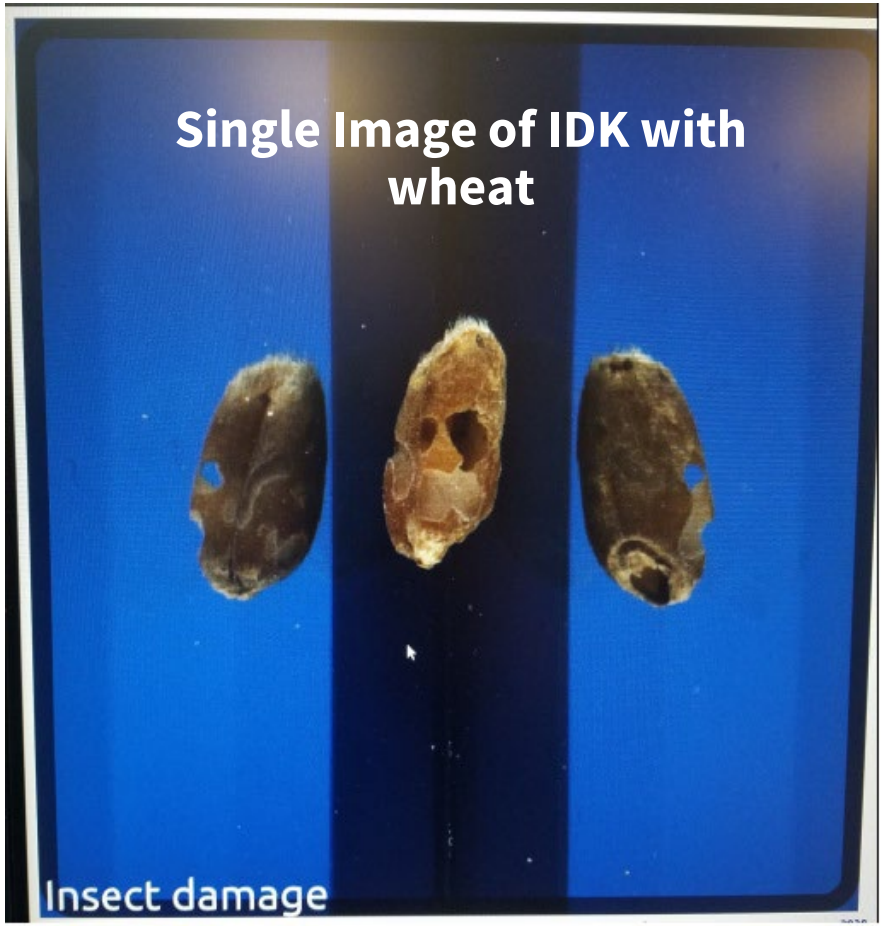
Cgrain Value

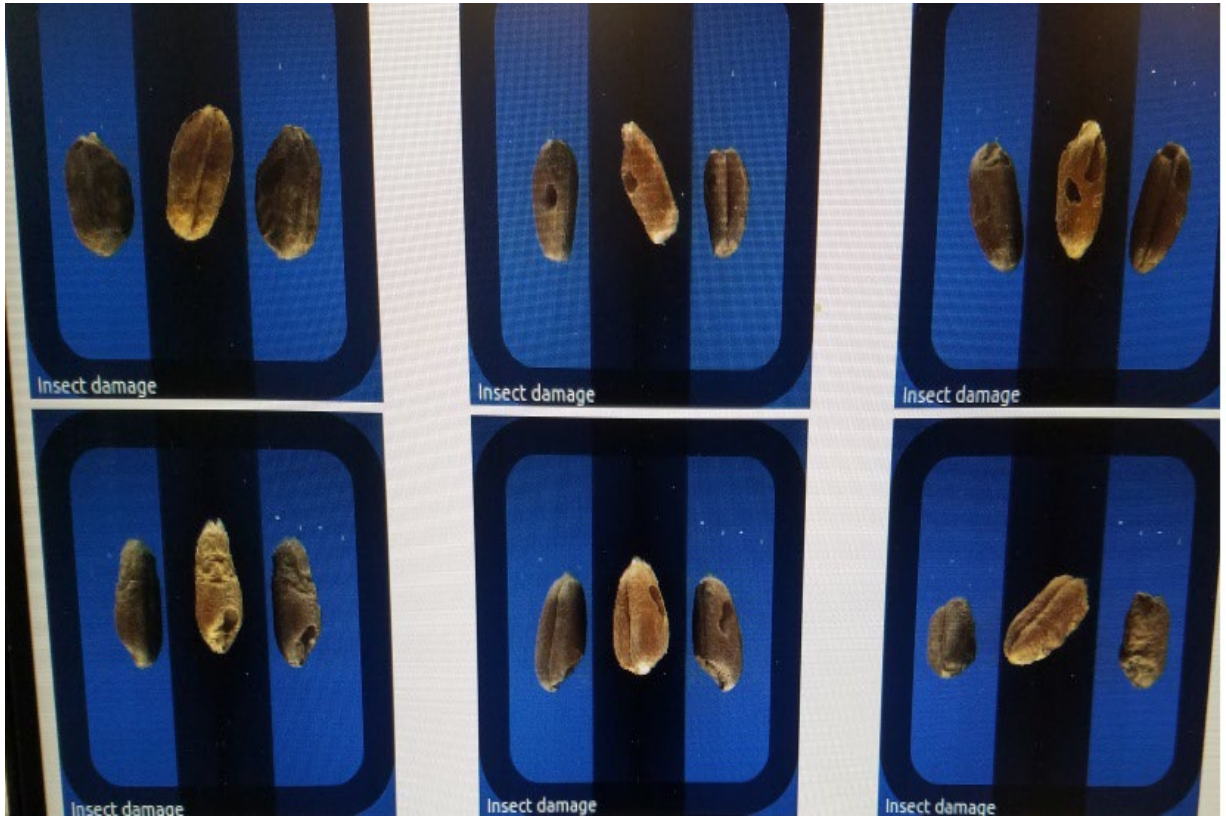
Damage Type	
Sound Kernels	9964
Germ Damage	10,249
Insect damage (IDK)	28,556
Sprout Damage	12,468

Current Testing of Cgrain



Current Testing of Cgrains





Screen shot of unassigned wheat damage kernels to be confirmed by BAR members

Future Testing of Cgrain

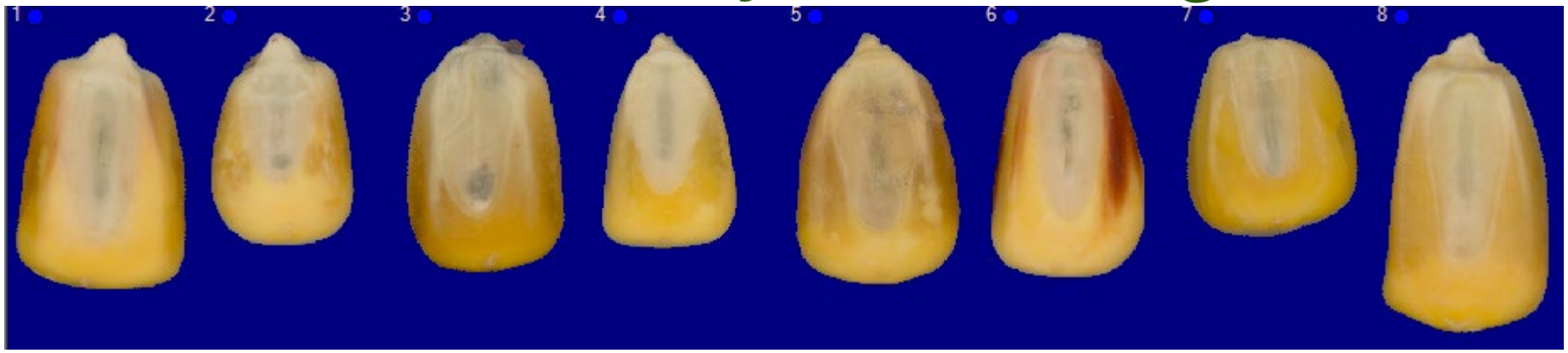
- Continue building reference library.
- Analyze the accuracy.
- Compare accuracy between Cgrain and BAR with blind samples.
- Update initial prediction model.

VideometerLab Update

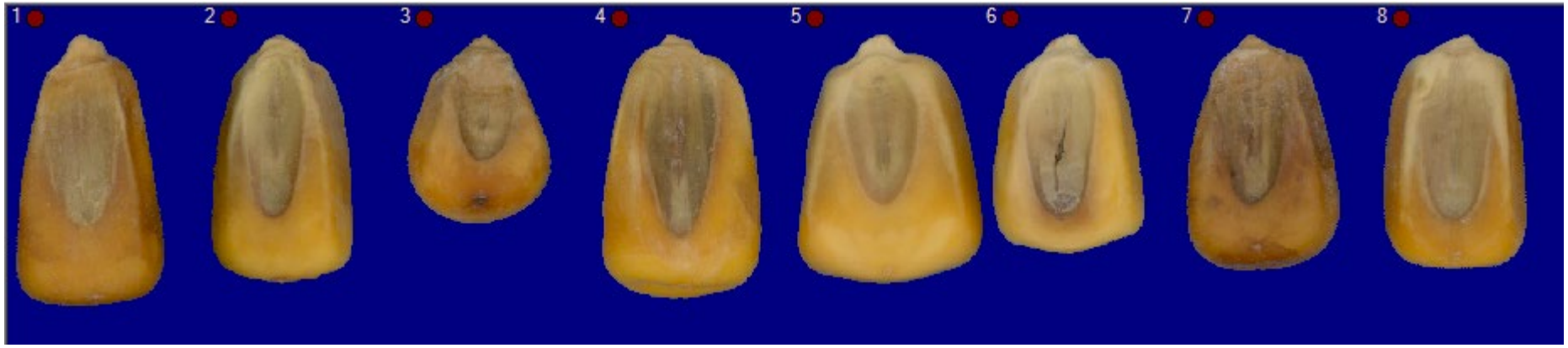
Corn Damage Library Table with VideometerLab

Damage Type	10000
Sound Kernels	116955
C-1.0 Blue-Eye Mold Damage	10378
C-1.1 Purple Plumule (not damage)	54
C-2.0 Cob Rot Damage	2741
C-3.0 Drier Damage	128
C-4.0 Germ Damage	10192
C-5.0 Heat Damage (drier)	0
C-5.2 Heat Damage (yellow)	3274
C-6.0 Insect Damage	10080
C-7.0 Mold Damage	5433
C-7.1 Not Damage (dirt)	128
C-7.2 Mold Damage (pink epicoccum)	0
C-8.0 Silk Cut	888
C-9.0 Sprout Damage	2959
C-10.0 Surface Mold (blight)	97
C-11.0 Surface Mold (more than slight)	16

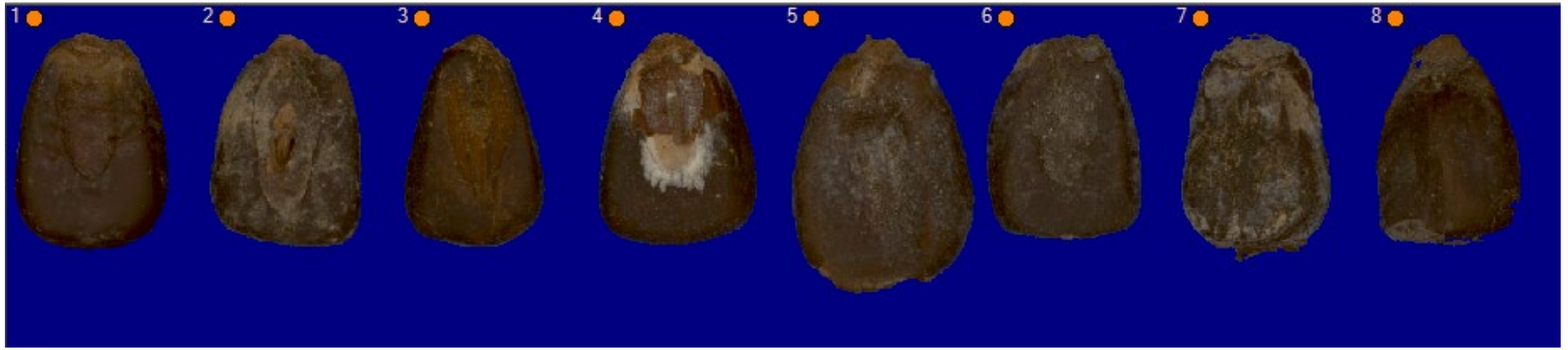
C-1.0 Blue Eye Mold Damage



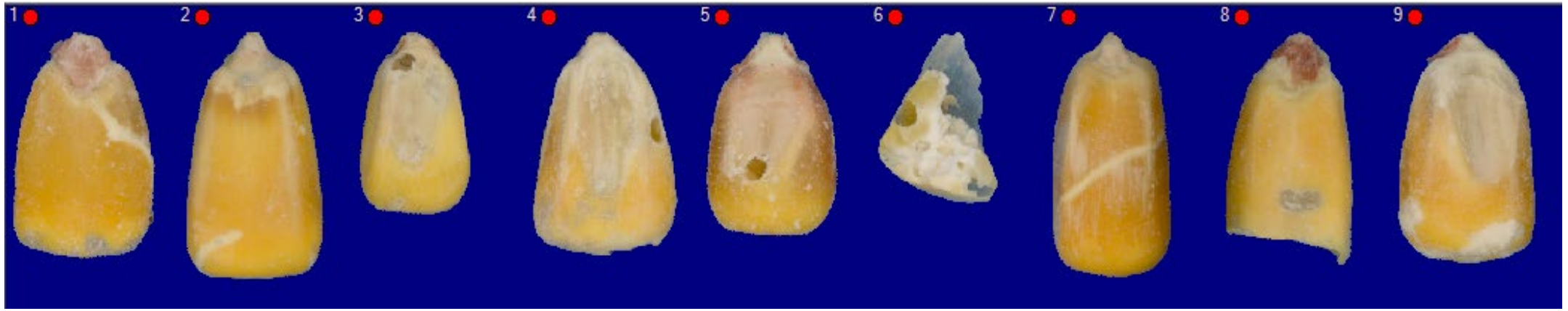
C-4.0 Germ



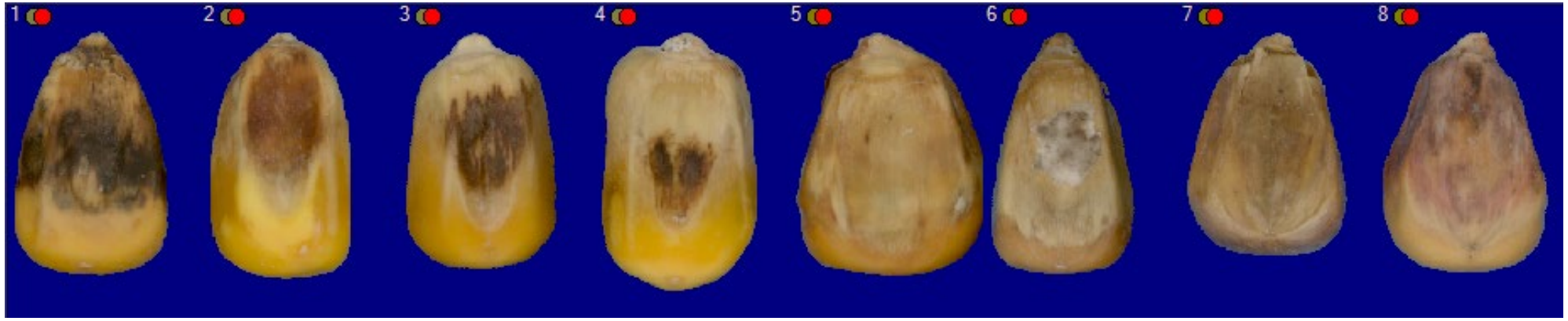
C-5.2 Heat Damage



C-6.0 Insect Damage

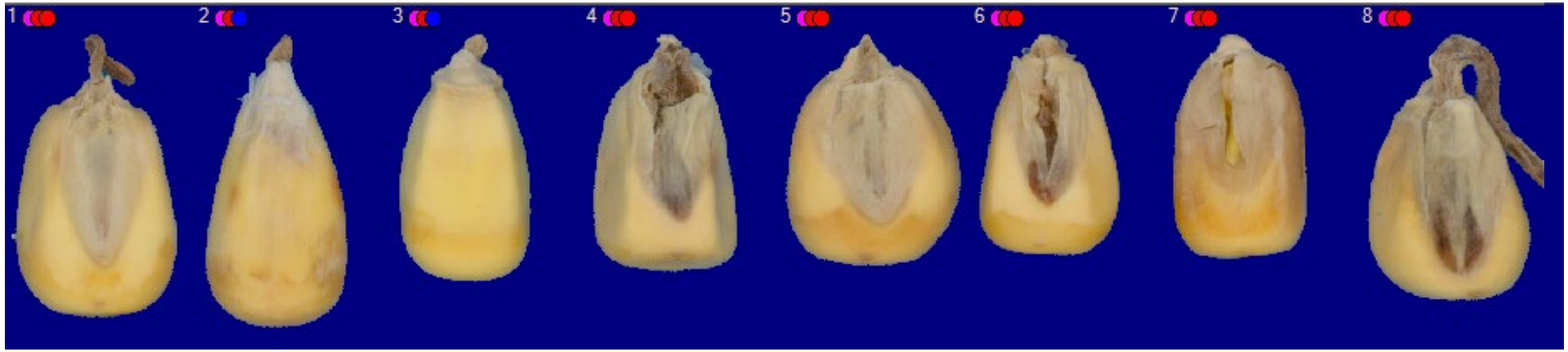


C-2.0 Cob Rot Damage

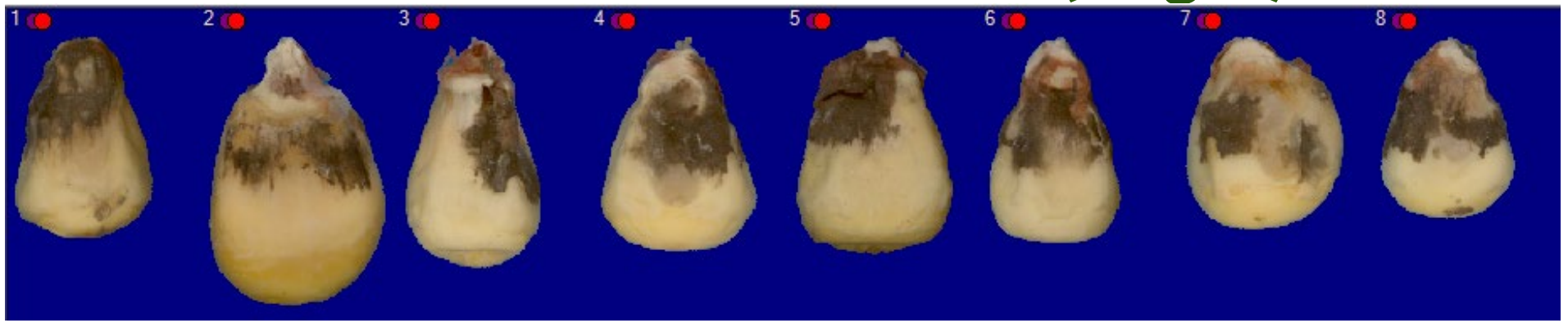


C-7.0 Mold Damage

C-9.0 Sprout Damage



C-10.0 Surface Mold (Blight)

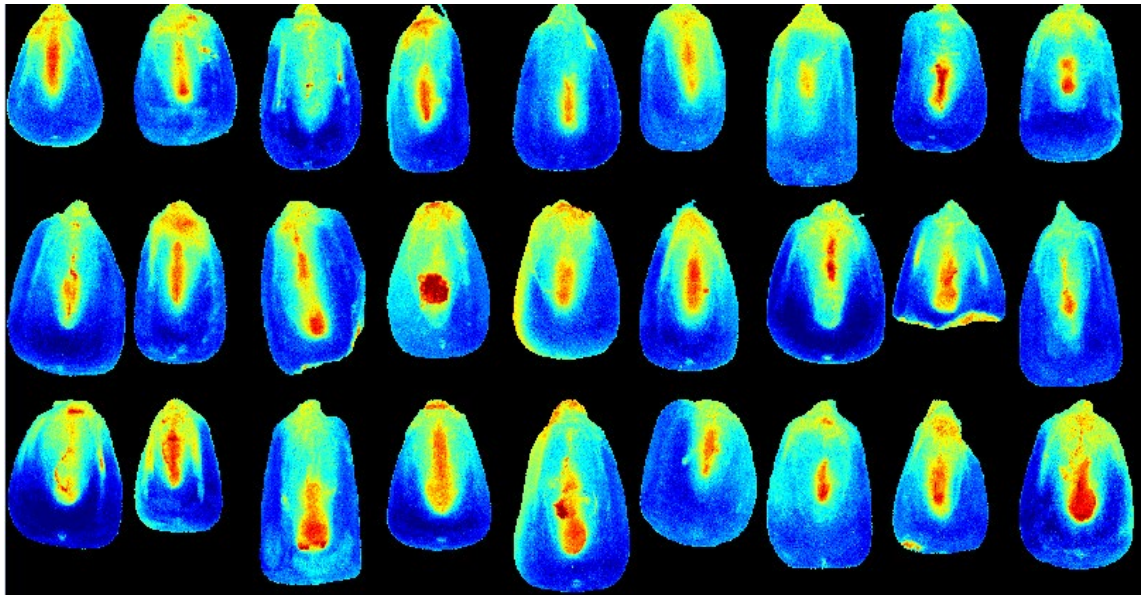


Multispectral Image Detection of Blue Eye Mold

Blue eye mold show up as red colors in the heat map, i.e. detected as positive score.

RGB Color image

Multispectral heat map

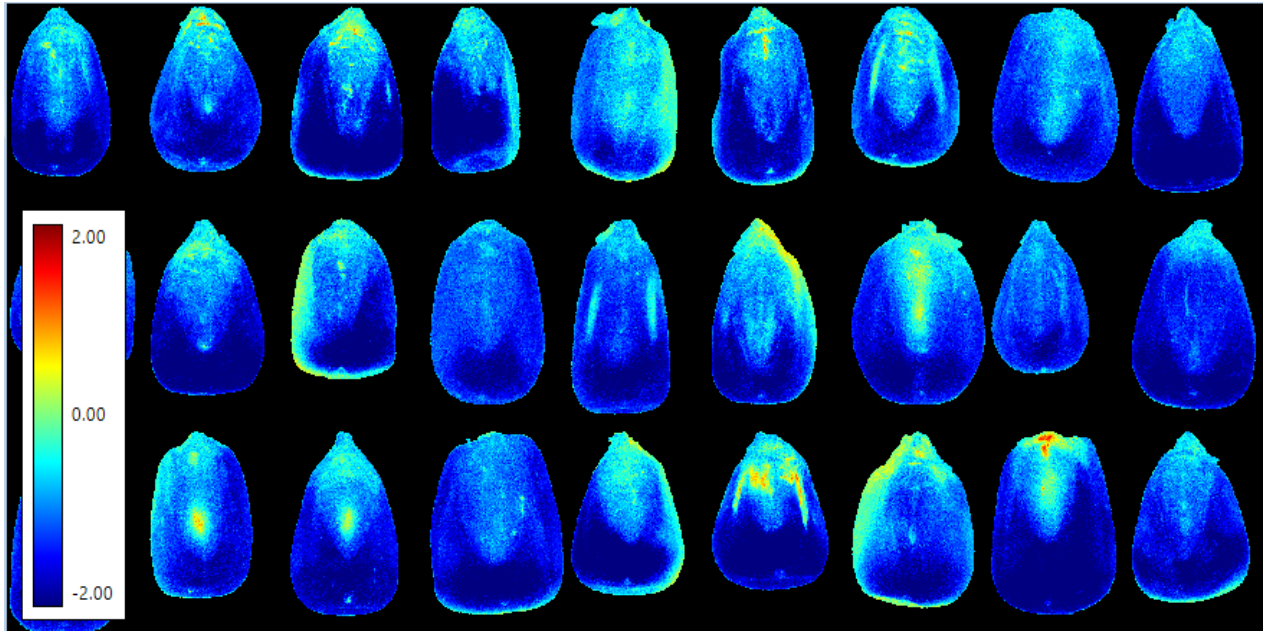


Multispectral image detection of Blue Eye Mold—Purple Plumule

Purple plumule show up with blue/green colors in the heat map, i.e. detected as negative score.

RGB Color image

Multispectral heat map

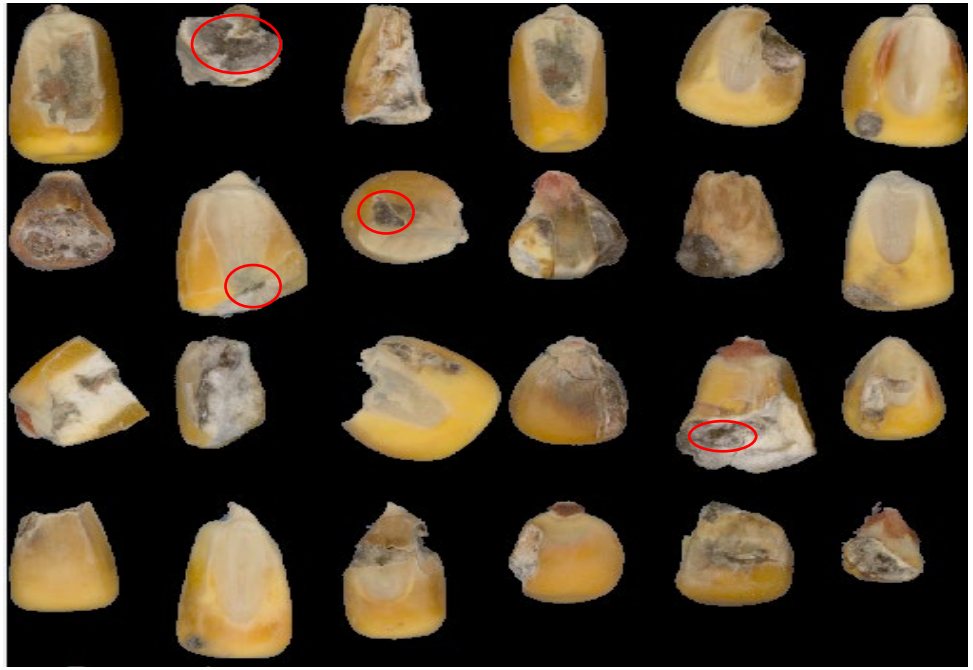


Multispectral image detection of Black Mold

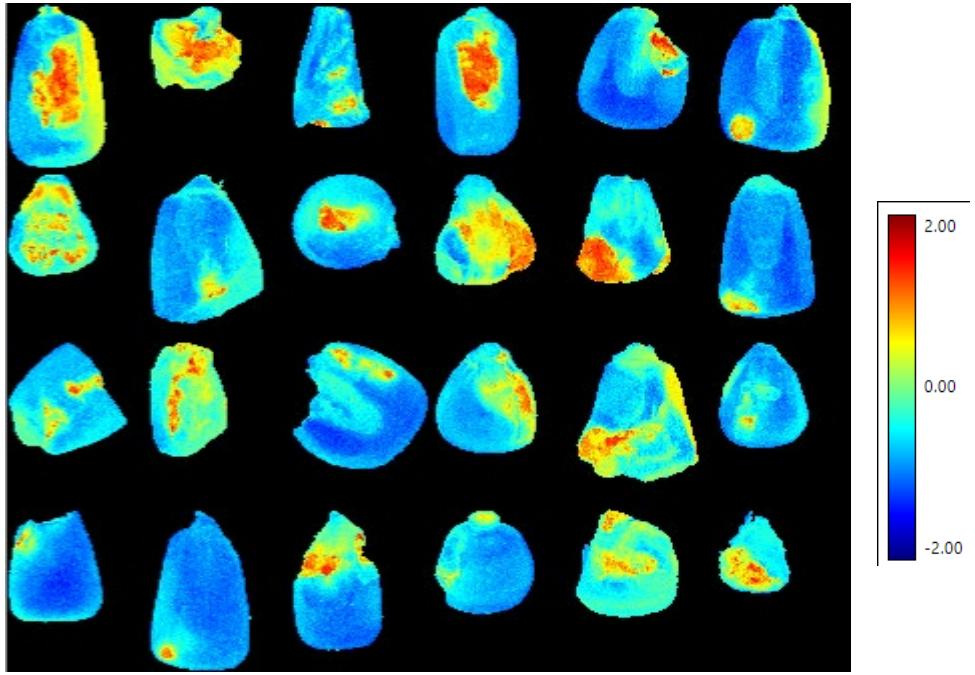
Red rings in RGB image show locations of black mold.
Black mold shows up as red colored pixels in heat map (positive score)

Black Mold Damaged Kernels

RGB Color image



Multispectral heat map



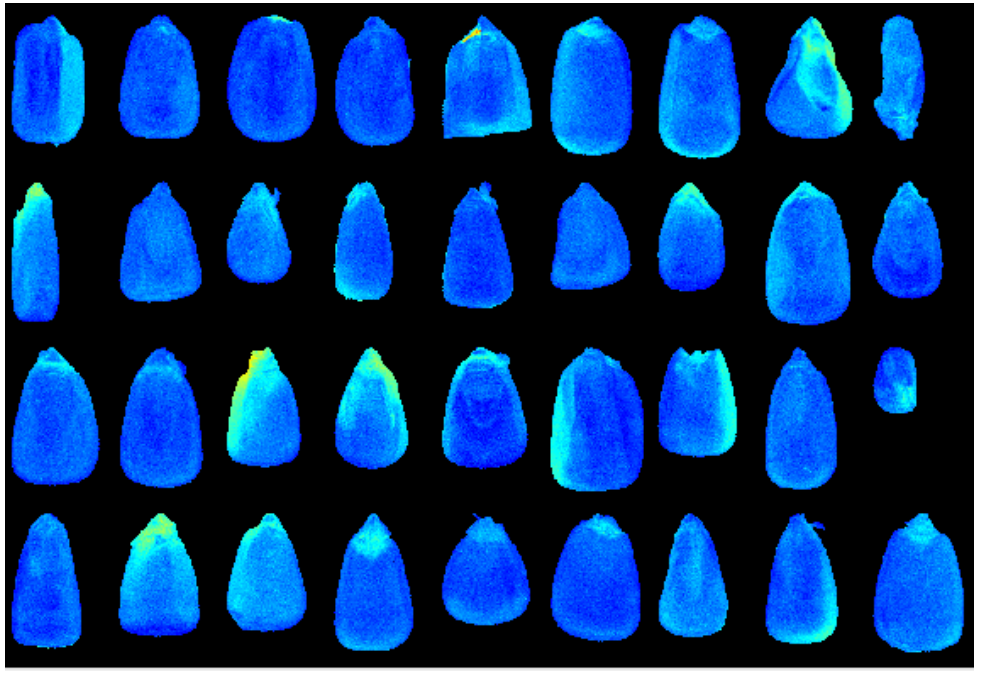
Multispectral image detection of Black Mold

RGB image show examples of healthy kernels. Heat map shows only blue/green colors, i.e. no black mold detected.

Healthy kernels

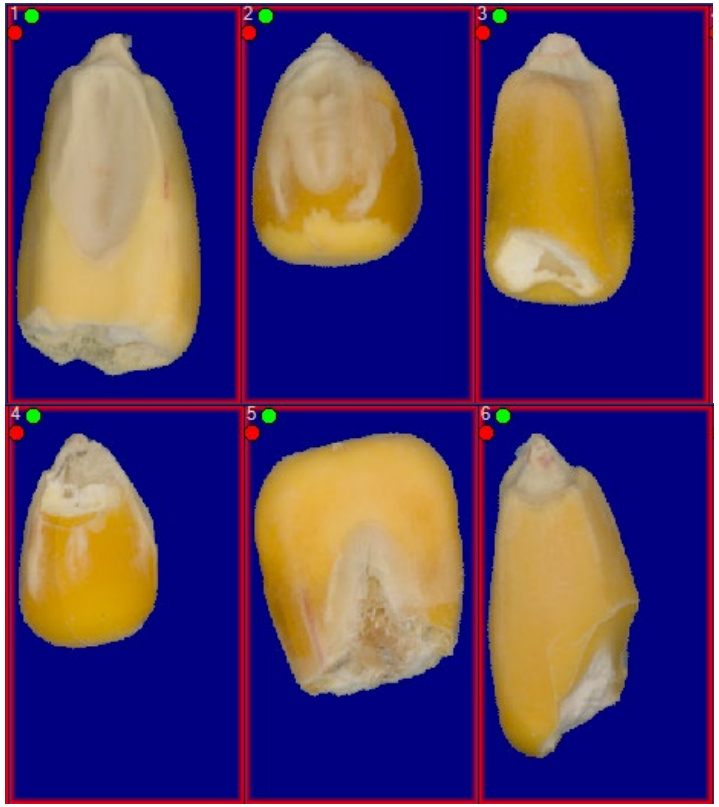
RGB Color image

Multispectral heat map



Misclassifications examples

Healthy kernels classified as Insect Damage.



Current Testing of Videometer

Image of sample plate with corn

Processed plate image with corn

Future Testing of Videometer

- Test Different samples sizes.
- Update calculation of damage percentages including orientation (up/down).
- Analyze the systems accuracy using belt drive system.
- Compare the accuracy between Videometer and BAR with blind samples.
- Update initial prediction model .

Thank You!