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MEMORANDUM

TO: Wheat Variety Release Committee

FROM: Hwa-Young Heo and Jason Cook, Spring Wheat Breeders

DATE: February 5th, 2026

RE: Proposal for licensed release of MT21487 Clearfield hard red spring wheat

Motion: Licensed release of Clearfield hard red spring wheat line, MT21074.

Pedigree: Dagmar*2/NS-Presser CLP

CONTRIBUTORS

- Dr. Jason Cook, Mr. Lucas Wright, Mr. Jared Lile, Ms. Mei Ling Wong, Ms. Deanna Nash, Dr. Hwa-Young Heo, MSU Bozeman, MT
- Dr. Jed Eberly, Mr. Simon Fordyce, MSU-CARC, Moccasin, MT
- Dr. Chengci Chen, Ms. Calla Kowatch-Carlson, and Dr. Frankie Crutcher, MSU-EARC, Sidney, MT
- Ms. Peggy Lamb MSU-NARC, Havre,
- Dr. Kent McVay, MSU-SARC, Huntley, MT
- Dr. Jessica Torrion, Dr. Joseph Jenson MSU-NWARC, Creston, MT
- Mr. Doug Holen, MSU Foundation Seed, Bozeman, MT
- Mr. Donny Gray, 2nd Nature Research, LLC, Bozeman, MT
- Dr. Dale Clark and Mr. Trevor Schafer, Nutrien Ag Solutions, Bozeman, MT

Seed Availability: Breeder's seed (F4:10) was planted in the spring of 2025 in Bozeman, MT, and planted again for further increase during the fall of 2025 in Yuma, AZ. The Yuma seed increase was contracted with 2nd Nature Research. We are aiming to have 20 bushels of breeder seed available for the spring 2026 growing season.

Key characteristics:

- Two-gene Clearfield herbicide resistant line
- High yield potential
- Good protein content
- Good test weight
- Very good End-Use quality

Breeding History and Agronomic Performance:

MT21487 was derived from a single backcross 'Dagmar'*2/'NS-Presser CLP' to transfer two Clearfield imidazolinone herbicide resistance genes (*als1* and *als2*) from NS-Presser CLP into Dagmar. Dagmar (Heo et al. 2020) was released by MAES in 2019, and NS-Presser CLP (Heo et al. 2018) was released by MAES in 2016 as a two-gene Clearfield line in a 'Vida' (Lanning et al. 2006) background. Due to the backcross, MT21487 is predicted to be 75% Dagmar and 25% NS-Presser CLP.

MT21487 was assayed for herbicide resistance and presence of the two resistance genes via BASF approved KASP markers. MT21487 was also tested following BASF protocols for herbicide resistance in qualification trials managed by Nutrien Ag Solutions. Lastly, we submitted a sample of breeder seed to the Montana State Seed Lab to run a Clearfield confirmation test. MT21487 passed this test (see below).

Yield and other agronomic measurements were collected from the Advanced Yield Trial (AYT) during the 2023 – 2025 growing seasons totaling 29 location-years including 20 rainfed and 9 irrigated growing environments. Across rain-fed environments, MT21487 was the top yielding line, 60.5 bu/ac (Table 1). Among all environments, including irrigated and high-rainfall environments, MT21487 was the second highest yielding line at 76.4 bu/ac (Table 2). Grain protein content across all environments was 0.3% lower than Dagmar, but 0.5% higher than NS-Presser CLP (Table 3). Test weight was 61.2 lbs/bu across all environments compared to Dagmar that was 61.4 lbs/bu and NS-Presser CLP that was 59.8 lbs/bu (Table 4). Heading date was 0.9 days later than Dagmar, but 3.9 days earlier than NS-Presser CLP. Solid-stem scores for MT21487 were 15.0 compared to Dagmar that was 19.0 and NS-Presser CLP solid stem score of 9.1. Sawfly cutting data collected from Fort Benton, MT during the 2024-2025 growing seasons showed MT21487 was cut 44.2% whereas Dagmar was cut 40% (Table 4). It appears MT21487 is more prone to sawfly cutting compared to Dagmar under severe sawfly infestation.

End-use quality was tested at six AYT locations grown in 2023 – 2024 (Table 5). Overall, MT21487 end-use quality was very good. MT21487 end-quality was similar to better than Dagmar for nearly all measured traits. Only loaf volume for MT21487 was slightly lower, 19 cc, than Dagmar. Compared to NS Presser CLP, MT21487 has substantially higher mixograph mix tolerance and mix time indicating

stronger gluten strength. MT21487 meets or surpasses all breeding targets for end-use quality traits in this data set,

Data collected from 13 Off-Station Yield Trial locations consisting of 10 rainfed and 3 irrigated environments grown in 2025 allowed for additional comparisons between MT21487 and varieties commonly grown in Montana (Table 6). In rainfed environments, MT21487 yielded 4.5% less than Dagmar, and 3.5% less across all environments. Grain protein content was 0.3% lower than Dagmar, and test weight was the same across all environments. Sawfly cutting was recorded from three locations. The sawfly pressure was not as severe as what was observed in Fort Benton, MT, but data indicated that MT21487 had similar sawfly resistance to Dagmar in the off-station growing environments.

MT21487 was evaluated in several disease screening nurseries. Data indicated MT21487 is susceptible to fusarium head blight, stripe rust and leaf rust (data not shown). MT21487 has moderate resistance to domestic stem rust races (data not shown). Data is insufficient to provide ratings for other diseases.

The Clearfield trade name for resistance to imidazolinone herbicide is owned by BASF. BASF requires six herbicide qualification trials over a two-year period to ensure the genes provide ample herbicide resistance. Four qualification trials were conducted in 2024 and 2025 by Nutrien Ag Solutions. The data is under review by BASF to approve MT21487 as a Clearfield variety. This variety will need to be licensed to an entity with an approved Clearfield commercialization license from BASF.

References:

Heo, H.-Y., Lanning, S. P., Lamb, P. F., Nash, D., Wichman, D. M., Eberly, J., . . . Talbert, L. E. (2020). Registration of 'Dagmar' hard red spring wheat. *Journal of Plant Registrations*, 14(1), 43-48. doi:https://doi.org/10.1002/plr2.20023

Heo, H.-Y., Blake, N. K., Lanning, S. P., Lamb, P. F., Nash, D., Wichman, D. M., . . . Talbert, L. E. (2018). Registration of 'NS Presser CLP' Hard Red Spring Wheat. Journal of Plant Registrations, 12(1), 70-73. doi:https://doi.org/10.3198/jpr2017.02.0008crc

Lanning, S. P., Carlson, G. R., Nash, D., Wichman, D. M., Kephart, K. D., Stougaard, R. N., . . . Talbert, L. E. (2006). Registration of 'Vida' wheat. *Crop Science*, 46(5), 2315-2316. doi:10.2135/cropsci2006.03.0167

Table 1. Grain yield (bu/ac) grown in 20 Advanced Yield trial (AYT) rain-fed locations in 2023 - 2025.

Loc.	Bozeman (rain-fed)	Conrad	Fort Benton	Havre	Hingham	Moccasin	Sidney (rain-fed)	Overall mean
Year	2023, 2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	
MT 21487	**107.8**	**41.8**	**56.2**	**55.6**	**41.5**	**40.5**	**80.1**	**60.5**
VIDA	**100.4**	**37.6**	**62.2**	**54.1**	**45.7**	**43.3**	**77.8**	**60.2**
MT DUTTON	**104.8**	**40.4**	**55.6**	**52.5**	**45.4**	**38.0**	**80.8**	**59.6**
MT UBET	**108.1**	35.8	**52.0**	**52.1**	**46.5**	**41.6**	**81.2**	**59.6**
MT 21484	**103.6**	**42.6**	**55.3**	**55.2**	40.5	**41.9**	**76.9**	**59.4**
MT CARLSON	**102.2**	**41.1**	**55.5**	**54.4**	**43.5**	36.9	**79.9**	**59.1**
DAGMAR	**101.0**	**41.2**	**55.9**	**54.4**	40.6	**43.0**	**76.8**	**59.0**
ROCKER	**99.9**	**40.6**	**61.4**	**50.4**	**41.9**	36.1	74.9	**57.9**
MT 21074	**100.6**	**40.0**	**61.1**	**52.4**	40.6	**38.9**	71.4	**57.9**
MT 21174	**102.4**	**40.8**	50.0	**53.7**	40.1	**41.6**	74.7	**57.6**
NS PRESSER CLP	**98.3**	**38.3**	**58.7**	**49.2**	**42.5**	36.7	75.6	**57.0**
LCS ASCENT	**102.6**	34.6	46.4	**53.9**	**42.6**	36.4	**79.2**	56.5
LANNING	**100.8**	33.6	49.2	**52.1**	41.1	34.4	**79.1**	55.8
DUCLAIR	**98.8**	**36.7**	**55.8**	**49.2**	**42.0**	**38.0**	68.4	55.6
WB GUNNISON	87.2	**38.6**	**59.6**	**53.9**	**43.9**	34.6	66.2	54.9
SY LONGMIRE	**97.6**	36.2	**55.1**	48.3	41.2	32.4	72.5	54.8
ND STAMPEDE	**102.4**	32.2	46.1	**50.1**	**43.4**	34.9	73.0	54.6
SY ROCKFORD	**102.9**	33.1	42.6	**54.0**	37.0	35.2	75.7	54.4
REEDER	**100.6**	35.7	43.6	**49.1**	**42.3**	33.2	73.1	53.9
WB 9879 CLP	**93.6**	35.1	**53.7**	48.6	40.0	36.6	69.5	53.9
McNEAL	88.9	32.7	46.8	48.3	**44.3**	35.8	73.4	52.9
LCS BOOM	**95.6**	33.4	42.5	**51.0**	**42.6**	30.6	72.2	52.6
AP GUNSMOKE CL2	91.7	34.7	42.1	**49.5**	38.5	33.6	74.7	52.1
AP SMITH	**95.2**	33.2	40.3	48.9	36.8	33.7	73.1	51.6
AAC CONCORD	87.1	35.7	49.6	44.9	40.5	34.4	65.0	51.0
THATCHER	73.4	25.9	39.1	39.9	40.5	29.3	57.6	43.7
Mean (n=26)	**98.0**	**36.6**	**51.4**	**51.0**	**41.7**	**36.6**	**74.0**	**55.6**
C.V.	7.8	10.0	13.1	8.0	7.6	9.2	4.0	6.7
Prob. (line)	<0.05	<0.001	<0.001	<0.01	<0.05	<0.001	<0.001	<0.001
LSD (0.05)	**15.7**	**6.0**	**11.0**	**6.7**	**5.2**	**5.5**	**4.9**	**4.0**

Table 2. Grain yield (bu/ac) grown in 29 Advanced Yield trial (AYT) rain-fed and irrigated locations in 2023 - 2025.

Loc.	Bozeman (rainfed)	Conrad	Fort benton	Havre	Hingham	Moccasin	Sidney (rainfed)	Bozeman (irrigated)	Kalispell (high rainfall)	Sidney (irrigated)	Overall mean
Year	2023, 2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	N=29
MT DUTTON	**104.8**	**40.4**	**55.6**	**52.5**	**45.4**	**38.0**	**80.8**	**115.1**	**119.5**	**114.5**	**76.7**
MT 21487	**107.8**	**41.8**	**56.2**	**55.6**	**41.5**	**40.5**	**80.1**	**109.6**	**113.3**	**117.6**	**76.4**
MT CARLSON	**102.2**	**41.1**	**55.5**	**54.4**	**43.5**	36.9	**79.9**	**113.7**	**119.2**	**112.9**	**75.9**
DAGMAR	**101.0**	**41.2**	**55.9**	**54.4**	40.6	**43.0**	**76.8**	**110.6**	**119.8**	**112.8**	**75.6**
MT 21484	**103.6**	**42.6**	**55.3**	**55.2**	40.5	**41.9**	**76.9**	**107.8**	**112.4**	**118.0**	**75.4**
VIDA	**100.4**	**37.6**	**62.2**	**54.1**	**45.7**	**43.3**	**77.8**	**107.9**	**110.9**	**111.7**	**75.2**
MT UBET	**108.1**	35.8	**52.0**	**52.1**	**46.5**	**41.6**	**81.2**	**108.8**	**108.9**	**114.4**	**74.9**
LCS ASCENT	**102.6**	34.6	46.4	**53.9**	**42.6**	36.4	**79.2**	**116.5**	**116.9**	**114.4**	**74.4**
MT 21174	**102.4**	**40.8**	50.0	**53.7**	40.1	**41.6**	74.7	**110.5**	**114.7**	**111.1**	**74.0**
MT 21074	**100.6**	**40.0**	**61.1**	**52.4**	40.6	**38.9**	71.4	**113.4**	107.9	105.0	73.1
ROCKER	**99.9**	**40.6**	**61.4**	**50.4**	**41.9**	36.1	74.9	104.2	105.2	**112.3**	72.7
NS PRESSER CLP	**98.3**	**38.3**	**58.7**	**49.2**	**42.5**	36.7	75.6	102.6	105.1	109.0	71.6
SY LONGMIRE	**97.6**	36.2	**55.1**	48.3	41.2	32.4	72.5	**107.6**	**110.1**	**113.8**	71.5
LANNING	**100.8**	33.6	49.2	**52.1**	41.1	34.4	**79.1**	102.7	**110.4**	110.5	71.4
DUCLAIR	**98.8**	**36.7**	**55.8**	**49.2**	**42.0**	**38.0**	68.4	**108.3**	106.6	109.8	71.4
ND STAMPEDE	**102.4**	32.2	46.1	**50.1**	**43.4**	34.9	73.0	**110.3**	102.5	**115.7**	71.1
WB 9879 CLP	**93.6**	35.1	**53.7**	48.6	40.0	36.6	69.5	104.8	**110.1**	**111.8**	70.4
REEDER	**100.6**	35.7	43.6	**49.1**	**42.3**	33.2	73.1	101.7	**109.4**	109.5	69.8
SY ROCKFORD	**102.9**	33.1	42.6	**54.0**	37.0	35.2	75.7	**108.8**	100.2	107.9	69.7
LCS BOOM	**95.6**	33.4	42.5	**51.0**	**42.6**	30.6	72.2	104.4	**110.0**	**110.9**	69.3
WB GUNNISON	87.2	**38.6**	**59.6**	**53.9**	**43.9**	34.6	66.2	102.1	108.7	96.2	69.1
AP GUNSMOKE CL2	91.7	34.7	42.1	**49.5**	38.5	33.6	74.7	103.1	104.5	**115.5**	68.8
AP SMITH	**95.2**	33.2	40.3	48.9	36.8	33.7	73.1	102.4	107.6	108.7	68.0
McNEAL	88.9	32.7	46.8	48.3	**44.3**	35.8	73.4	98.2	101.1	106.0	67.6
AAC CONCORD	87.1	35.7	49.6	44.9	40.5	34.4	65.0	92.3	100.6	95.0	64.5
THATCHER	73.4	25.9	39.1	39.9	40.5	29.3	57.6	83.4	90.4	90.5	57.0
Mean (n=26)	**98.0**	**36.6**	**51.4**	**51.0**	**41.7**	**36.6**	**74.0**	**105.8**	**108.7**	**109.8**	**71.4**
C.V.	7.8	10.0	13.1	8.0	7.6	9.2	4.0	6.6	6.2	4.1	5.5
Prob. (line)	<0.05	<0.001	<0.001	<0.01	<0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LSD (0.05)	**15.7**	**6.0**	**11.0**	**6.7**	**5.2**	**5.5**	**4.9**	**11.4**	**11.1**	**7.4**	**3.5**

Table 3. Grain protein content (%) collected from 30 Advanced Yield trial (AYT) rain-fed and irrigated locations in 2023 - 2025.

Loc.	Bozeman (rainfed)	Conrad	Fort benton	Havre	Hingham	Moccasin	Sidney (rainfed)	Bozeman (irrigated)	Kalispell (high rainfall)	Sidney (irrigated)	Overall mean
Year	2023, 2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	2023-2025	N=29
AP GUNSMOKE CL2	**15.2**	**15.6**	**15.6**	16.6	**13.1**	13.7	**13.8**	**14.9**	**13.1**	**14.3**	**14.6**
LANNING	**15.2**	15.2	**15.8**	16.5	**13.0**	13.2	**13.6**	14.6	**13.6**	**14.8**	**14.6**
DAGMAR	**15.0**	15.1	**15.4**	16.1	**12.8**	13.3	**14.0**	14.7	**13.4**	**14.9**	**14.5**
MT 21074	**15.1**	15.3	15.0	**16.8**	**12.8**	13.4	13.3	**15.1**	**13.2**	14.2	**14.4**
AAC CONCORD	**15.2**	14.6	**15.3**	16.6	11.9	13.3	**13.9**	**15.2**	**13.1**	**14.6**	**14.4**
REEDER	**15.1**	15.1	**15.2**	16.1	**12.7**	13.4	**13.6**	**14.9**	**13.4**	14.0	**14.4**
MT 21174	**15.0**	15.0	**15.3**	16.7	**12.5**	**13.9**	**13.7**	14.6	12.6	14.2	**14.4**
AP SMITH	**15.1**	15.0	14.7	16.3	**13.2**	13.4	**13.8**	14.5	**13.6**	13.8	14.3
WB 9879 CLP	**14.8**	15.0	**15.2**	16.3	**12.9**	13.5	**14.0**	14.4	**12.9**	13.7	14.3
MT 21484	14.5	15.1	**15.2**	16.3	**12.9**	12.9	**13.4**	**15.0**	12.8	**14.6**	14.3
MT 21487	**15.0**	15.1	14.9	16.2	**12.5**	13.4	13.3	**14.9**	12.3	**14.4**	14.2
SY LONGMIRE	**14.7**	15.0	**15.2**	16.7	12.4	13.2	13.1	14.5	**13.1**	13.8	14.2
LCS BOOM	**14.7**	15.1	14.8	15.9	**12.9**	13.0	**13.5**	14.5	**13.2**	14.1	14.2
THATCHER	**14.8**	14.3	14.4	16.5	12.2	13.5	**13.5**	**14.9**	**12.9**	14.0	14.1
McNEAL	**15.0**	14.9	14.9	16.0	12.2	13.7	**13.6**	14.7	12.0	13.9	14.1
MT UBET	14.5	15.4	14.9	16.1	12.4	13.0	12.8	14.5	**13.0**	14.2	14.1
DUCLAIR	**14.7**	15.0	14.5	16.5	**12.5**	13.6	13.0	14.4	12.8	13.8	14.1
MT DUTTON	**14.6**	14.9	15.0	16.1	**12.5**	12.7	12.9	14.6	**13.0**	14.2	14.1
ND STAMPEDE	**14.9**	14.9	14.6	16.6	**12.9**	13.4	13.3	14.4	11.8	13.4	14.0
ROCKER	**14.7**	14.4	14.7	16.1	11.8	13.4	13.2	14.6	12.7	13.7	13.9
MT CARLSON	14.5	14.4	14.6	15.9	12.3	13.2	13.0	14.1	12.4	13.7	13.8
VIDA	14.5	14.8	14.6	15.5	12.0	13.0	12.7	14.4	12.6	13.9	13.8
NS PRESSER CLP	**14.6**	14.6	14.7	15.8	11.4	13.1	12.8	14.4	12.2	13.4	13.7
SY ROCKFORD	13.8	14.8	14.1	15.9	**12.6**	13.2	12.6	13.7	12.5	13.1	13.6
WB GUNNISON	14.1	14.0	13.8	15.2	11.9	**13.9**	12.8	13.8	12.4	13.1	13.5
LCS ASCENT	14.0	14.5	13.4	15.4	12.4	12.9	12.6	13.7	12.5	13.3	13.5
Mean (n=26)	**14.7**	**14.9**	**14.8**	**16.2**	**12.5**	**13.3**	**13.3**	**14.5**	**12.8**	**14.0**	**14.1**
C.V.	3.0	3.9	2.9	3.7	3.8	4.7	3.1	2.1	3.7	3.1	2.2
Prob. (line)	<0.05	ns	<0.001	ns	<0.01	ns	<0.001	<0.001	<0.001	<0.001	<0.001
LSD (0.05)	**0.7**	**-**	**0.7**	**-**	**0.8**	**-**	**0.7**	**0.5**	**0.8**	**0.7**	**0.3**

Table 4. Agronomic traits collected from 30 Advanced Yield trial (AYT) rain-fed and irrigated locations in 2023 - 2025.

Traits	Test weight (lb/bu)	Heading date (Julian Days)	Plant height (inch)	Stem solidness (5-25)	Sawfly cutting (%)
Loc/Years	**30**	**17**	**27**	**Bozeman (23-25)**	**Fort benton (24-25)**
WB GUNNISON	61.4	174.5	29.5	10.9	**16.7**
MT 21074	61.7	176.2	31.0	17.8	**21.7**
ROCKER	61.8	176.4	30.9	11.8	**21.7**
WB 9879 CLP	60.4	175.2	30.4	**23.1**	**24.2**
VIDA	60.5	175.3	31.6	14.8	**33.3**
DAGMAR	61.4	172.5	31.9	19.0	40.0
MT 21174	61.0	173.2	32.9	18.0	40.0
AAC CONCORD	60.2	176.1	36.0	20.7	42.5
MT 21487	61.2	173.4	32.0	15.0	44.2
NS PRESSER CLP	59.8	177.3	33.0	9.1	45.0
MT 21484	61.5	173.1	32.0	17.4	47.5
DUCLAIR	60.0	172.6	31.5	**21.3**	50.0
SY LONGMIRE	61.6	174.3	30.0	**21.6**	51.7
MT DUTTON	60.3	174.8	31.4	12.1	58.3
MT CARLSON	60.8	173.5	30.7	18.6	62.5
AP SMITH	61.3	175.8	28.2	10.5	62.5
THATCHER	59.5	176.8	**40.0**	8.5	65.8
McNEAL	60.3	176.4	32.5	8.9	70.8
LCS ASCENT	61.8	**171.7**	30.7	7.8	71.7
LANNING	60.9	172.9	30.6	9.2	75.9
SY ROCKFORD	59.9	176.5	31.2	8.5	76.7
ND STAMPEDE	60.0	173.3	31.4	8.7	76.7
LCS BOOM	**62.4**	**171.3**	30.0	8.7	79.2
REEDER	61.2	174.8	32.7	9.1	82.5
AP GUNSMOKE CL2	61.0	174.2	30.3	8.6	85.0
MT UBET	60.8	173.6	30.6	13.9	89.2
Mean (n=26)	**60.9**	**174.4**	**31.7**	**13.6**	**55.4**
C.V.	0.8	0.3	2.5	8.9	21.2
Prob. (line)	<0.001	<0.001	<0.001	<0.001	<0.001
LSD (0.05)	**0.4**	**0.6**	**0.7**	**2.0**	**23.8**

Table 5. End-Use quality combined analysis of six Advanced Yield Trial (AYT) location-years in 2023 to 2024.

Variety/Line	Flour yield (%)	Flour protein (%, 14% m.b.)	Mixing tolerance	Mixo mixing time (min.)	Mixo water absorption (%)	Bake mix time (min.)	Bake water absorption (%)	Loaf volume (cc)
WB GUNNISON	67.0	12.7	**4.5**	**8.1**	66.4	**16.3**	77.2	1082
ND Stampede	69.1	**14.0**	**4.0**	5.3	**72.0**	12.8	**82.0**	**1127**
McNEAL	67.5	**14.0**	**4.0**	**7.8**	**71.2**	**15.7**	**80.5**	**1178**
SY LONGMIRE	69.6	13.9	**4.0**	4.9	67.8	12.1	77.7	**1131**
MT 21487	70.4	13.7	**3.8**	5.7	68.8	**15.0**	78.7	1101
AP SMITH	69.6	**14.5**	**3.8**	**7.3**	69.7	**16.8**	78.9	1038
AAC CONCORD	**71.6**	**14.5**	3.7	4.4	68.4	13.0	79.1	1079
ROCKER	67.9	13.8	3.5	6.7	67.7	13.5	77.7	**1129**
MT 21484	70.6	13.4	3.5	3.8	66.9	9.4	77.1	1080
DAGMAR	70.4	13.7	3.5	3.9	67.9	10.1	77.5	1120
SY INGMAR	70.1	**14.3**	3.3	6.3	**71.2**	13.8	**79.8**	**1152**
MT 21174	69.3	**14.4**	3.3	3.5	68.0	7.9	77.3	**1208**
DUCLAIR	69.0	13.8	3.3	4.5	67.7	11.1	77.6	**1130**
MT 21074	68.1	**14.0**	3.0	4.1	66.7	7.5	76.0	**1131**
AP GUNSMOKE CL2	69.2	**14.2**	3.0	5.0	67.8	11.6	77.5	898
SY ROCKFORD	69.6	13.1	2.8	4.1	67.7	9.2	77.6	1028
LCS BOOM	**71.2**	13.8	2.8	3.8	68.5	9.2	77.9	1119
LANNING	69.3	**14.1**	2.8	3.9	67.9	9.1	77.8	1123
THATCHER	69.2	**14.3**	2.7	3.9	67.8	9.9	77.4	1110
LCS ASCENT	70.6	12.7	2.7	4.2	65.7	10.1	75.2	1023
MT Ubet	70.8	13.6	2.7	3.7	65.6	8.4	75.1	1036
MT Carlson	67.4	13.7	2.5	3.3	66.4	7.4	76.2	1088
REEDER	68.0	**14.0**	2.0	3.1	66.6	6.7	75.8	1082
MT Dutton	70.0	13.2	1.8	2.6	65.7	4.9	75.1	1078
NS PRESSER CLP	70.4	13.5	1.5	3.4	65.9	8.6	74.7	1058
VIDA	**71.5**	13.2	1.3	3.4	66.2	7.5	76.0	1117
WB 9879 CLP	67.6	**14.1**	1.3	1.9	65.1	3.6	73.3	1017
MEAN (n=27)	**69.5**	**13.7**	**3.0**	**4.4**	**67.4**	**10.3**	**77**	**1094**
CV	1.2	3.9	23.1	19.8	3.0	21.5	2.8	6.6
PAROBA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LSD	**1.0**	**0.6**	**0.8**	**1.0**	**2.3**	**2.5**	**2.5**	**82**

bold : highest or earliest value within a column

bold : equal value to highest or earliest value within a column based LSD(0.05)

Table 6. Yield and agronomic traits collected from the 2025 Spring Wheat Off-Station Yield Trials.

	YIELD (bu/ac)			TEST WEIGHT (lb/bu)			GRAIN PROTEIN (%)			HEADING DATE (Julian)			HEIGHT (Inches)			SAWFLY CUTTING (%)
No. of environments	**10**	**3**	**13**	**10**	**3**	**13**	**10**	**3**	**13**	**1**	**1**	**2**	**10**	**3**	**13**	**3**
Variety/Line	RAINFED	IRRI	**TOTAL**	RAINFED	IRRI	**TOTAL**	RAINFED	IRRI	**TOTAL**	RAINFED	IRRI	**TOTAL**	RAINFED	IRRI	**TOTAL**	**TOTAL**
ROCKER	**51.4**	**101.5**	**62.9**	**62.6**	60.7	**62.2**	14.5	13.5	14.3	174.3	178.0	176.2	**27.4**	33.8	**28.9**	**6.0**
MT CARLSON	**52.1**	**98.0**	**62.7**	61.3	61.0	**61.2**	14.2	13.5	14.0	169.7	**177.0**	**173.4**	**27.1**	32.4	28.3	**8.3**
MT 21484	**51.1**	**101.5**	**62.7**	61.6	61.3	**61.5**	14.8	13.7	14.5	170.3	**175.7**	**173.0**	**27.3**	**35.2**	**29.1**	**6.8**
DAGMAR	**51.1**	**99.3**	**62.2**	**61.8**	61.4	**61.7**	15.0	13.5	14.6	**169.0**	**175.7**	**172.4**	**27.7**	33.8	**29.1**	**7.9**
MT DUTTON	**50.1**	**102.3**	**62.1**	60.7	60.3	60.6	14.7	13.4	14.4	172.7	177.3	175.0	**27.3**	32.7	**28.6**	**8.8**
VIDA	**51.1**	**95.8**	**61.4**	61.3	59.9	**61.0**	14.1	12.7	13.8	174.0	**177.0**	175.5	**28.0**	34.0	**29.4**	**7.7**
LCS ASCENT	**48.9**	**100.2**	**60.8**	**62.4**	62.0	62.3	14.0	12.5	13.7	**168.7**	**176.7**	**172.7**	**28.0**	33.4	**29.2**	19.1
MT 21487	**48.8**	**97.5**	**60.0**	**61.7**	61.6	**61.7**	14.6	13.4	14.3	170.7	**176.7**	**173.7**	**27.8**	34.5	**29.3**	**5.8**
MT UBET	**48.3**	**98.5**	**59.9**	61.2	60.9	**61.1**	14.5	13.6	14.2	170.0	**176.3**	**173.2**	26.3	32.8	27.8	14.3
ND STAMPEDE	**47.6**	**97.9**	**59.2**	60.9	61.3	**61.0**	14.5	13.2	14.2	171.0	**177.0**	**174.0**	**27.4**	34.3	**29.0**	23.6
LANNING	**46.4**	**100.6**	**58.9**	61.2	60.7	**61.1**	14.9	**14.2**	14.7	170.0	177.3	**173.7**	**26.6**	32.7	28.0	25.0
SY LONGMIRE	**47.7**	**92.7**	**58.1**	**62.3**	61.5	**62.1**	14.7	13.5	14.4	172.7	**176.3**	**174.5**	**26.9**	32.8	28.2	**6.2**
MT 21074	**48.0**	90.0	**57.7**	**62.5**	58.0	**61.5**	14.9	13.7	14.6	174.7	177.7	176.2	26.5	33.0	28.0	**4.1**
REEDER	**46.9**	**92.7**	**57.4**	**62.0**	60.5	**61.7**	14.7	13.7	14.4	173.0	178.0	175.5	**28.1**	**36.2**	**30.0**	19.2
WB 9879CLP	**46.4**	**92.7**	**57.1**	61.2	60.9	**61.1**	14.8	13.8	14.5	172.0	**176.7**	**174.4**	**26.6**	32.8	28.0	**3.5**
SY ROCKFORD	45.2	**94.8**	**56.7**	60.4	61.0	60.6	14.6	12.9	14.2	174.7	178.0	176.4	**27.5**	33.4	**28.9**	15.6
WB GUNNISON	44.4	**92.7**	**55.5**	61.5	61.2	**61.4**	14.2	12.9	13.9	172.3	**176.7**	**174.5**	26.2	31.8	27.5	**3.0**
AP SMITH	42.4	85.9	52.5	61.4	61.8	**61.5**	14.9	**14.0**	14.7	173.7	178.0	175.9	24.6	30.3	25.9	17.6
WB 9668	35.1	88.6	51.2	61.2	61.4	**61.2**	**15.9**	**14.6**	**15.5**	**168.0**	**177.0**	**172.5**	22.7	28.3	24.4	**6.5**
Mean (n=19)	**47.6**	**96.2**	**58.9**	**61.3**	**60.9**	**61.2**	**14.6**	**13.5**	**14.4**	**171.2**	**176.9**	**174.1**	**26.9**	**33.1**	**28.3**	**10.6**
C.V.	8.8	6.3	7.9	1.1	2.6	1.6	2.7	3.0	2.8	0.4	0.5	0.7	3.7	3.2	3.6	48.7
Prob. (line)	<0.001	<0.05	<0.001	<0.001	ns	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	<0.05	<0.001	<0.001	<0.001	<0.001
LSD (0.05)	**6.7**	**10.0**	**7.5**	**1.0**	**-**	**1.6**	**0.6**	**0.7**	**0.7**	**1.3**	**1.5**	**2.7**	**1.6**	**1.7**	**1.7**	**8.5**

bold : highest or earliest value within a column

bold : equal value to highest or earliest value within a column based LSD (0.05)

Montana State Seed Lab

PO Box 173145
Bozeman, MT 59717-3145

Laboratory Report Of Analysis

Account No.	Date Received	Date Completed	Lab Number
9614	**10/27/25**	**11/07/25**	**26-1195**

MSU - PSPP: Spring Wheat Breeding Program
Leon Johnson Hall 406
Bozeman, MT 59717

Information Provided by Sender

Product	MT21487
Kind	Wheat
Genus/Species	Triticum aestivum
Lot Number	BREEDER SEED - CLEARFIELD
Class	Breeder

Purity Analysis		Viability Analysis				
Component	**Purity**	**Germ Date**	**Germ %**	**Dormant %**	**Hard %**	**Total % Viable**
Wheat *Triticum aestivum*	-N-	-N-	-N-	-N-	-N-	-N-

Other Determinations

Clearfield Confirm	393/400 - Passed

Status: Completed

Tests Requested: Clearfield Confirm. No other tests requested.

This is not a bill. Please do not pay until we send you an invoice.

WARRANTY: We warrant that the purity and germination test results reported on this form have been carried out in accordance with AOSA rules unless otherwise specified. Test results reflect the condition of the submitted sample and may not reflect the condition of the seed lot from which the sample was taken.
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Signature: Bridget D. Westfall
Bridget Westfall, RST
Seal #139