

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

EXHIBIT C
OBJECTIVE DESCRIPTION OF VARIETY

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995. Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426). OMB Collection #0581-0055

NAME OF APPLICANT (S)	TEMPORARY OR EXPERIMENTAL DESIGNATION	VARIETY NAME
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Wheat
(Triticum spp.)

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Instructions:

- Please answer as many fields as possible. Missing information may be requested by the Plant Variety Protection Office. Significant omissions could delay or inhibit certificate of protection issuance.
- Data for quantitative plant characters should be based on a minimum of 100 plants.
- Royal Horticultural Society or any recognized color standard may be used to determine plant colors; designate system used:

Location:

Breeding Location Latitude (Decimal Degrees) Longitude (Decimal Degrees)

Trial Location Latitude (Decimal Degrees) Longitude (Decimal Degrees)

Area(s) of Adaptation

Morphology:

I. PLANT:

1. _____ Plant Kind:

- | | | |
|-----------|--------------------|-----------|
| 1. Common | 2. Durum | 3. Club |
| 4. Spelt | 5. Poulard | 6. Polish |
| 7. Emmer | 8. Other (Specify) | |

I. PLANT: (continued)

2. _____ Market Class:

- | | | |
|--------------------------|--------------------------|---------------------|
| 1. HRW (Hard Red Winter) | 2. HRS (Hard Red Spring) | 3. HWW (Hard White) |
| 4. SRW (Soft Red Winter) | 5. SW (Soft White) | |

3. _____ Vernalization:

- | | | |
|--------------------|-----------|-----------------|
| 1. Spring | 2. Winter | 3. Intermediate |
| 4. Other (Specify) | | |

4. _____ Coleoptile Anthocyanin:

- | | |
|-----------|------------|
| 1. Absent | 2. Present |
|-----------|------------|

5. _____ Juvenile Plant Growth:

- | | | |
|------------------------|----------------------------|---------------|
| 1. Prostrate | 2. Prostrate to Semi-Erect | 3. Semi-Erect |
| 4. Semi-Erect to Erect | 5. Erect | |

EARLY PLANT GROWTH HABIT:



Prostrate Intermediate Erect

6. _____ Plant Color: (Boot Stage)

- | | |
|-----------------|--------------------------|
| 1. Yellow-Green | 2. Yellow-Green to Green |
| 3. Green | 4. Green to Blue-Green |
| 5. Blue-Green | 6. Other (Specify) |

7. _____ Flag Leaf Orientation: (Boot Stage)

- | | |
|---------------|---------------------------|
| 1. Erect | 2. Erect to Semi-Erect |
| 3. Semi-Erect | 4. Semi-Erect to Recurved |
| 5. Recurved | 6. Other (Specify) |

8. _____ Flag Leaf Type:

- | | |
|----------------|------------|
| 1. Not Twisted | 2. Twisted |
|----------------|------------|

9. _____ Flag Leaf Glaucosity:

- | | |
|---------------|----------------|
| 1. Wax Absent | 2. Wax Present |
|---------------|----------------|

II. EAR

1. _____ Ear Emergence (Number of Days)
2. _____ Ear Emergence (Number of Days Earlier than*)
3. _____ Ear Emergence (Same Number of Days as*)
4. _____ Ear Emergence (Number of Days Later than*)

** Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial*

III. ANTHÉR:

1. _____ Anther Coloration:
 1. Yellow
 2. Purple
 3. White
 4. Other (Specify)

IV. PLANT HEIGHT:

1. _____ Plant Height Class:
 1. Semi-Dwarf
 2. Standard
2. _____ Plant Height (cm)
3. _____ Plant Height (cm Taller than*)
4. _____ Plant Height (cm Same as*)
5. _____ Plant Height (cm Shorter than*)

** Relative to a PVPO-Approved Commercial Variety Grown in the Same Trial*

V. STEM:

1. _____ Stem Anthocyanin Coloration:
 1. Absent
 2. Present
 3. Other (Specify)
2. _____ Stem Waxy Bloom:
 1. Absent
 2. Present
3. _____ Stem Hairiness (Last Internode of Rachis)
 1. Absent
 2. Present
 3. Other (Specify)

V. STEM: (continued)

4. _____ Stem: Internode Type:

- | | |
|---------------|-------------------------|
| 1. Hollow | 2. Hollow to Semi-Solid |
| 3. Semi-Solid | 4. Semi-Solid to Solid |
| 5. Solid | 6. Other (Specify) |

STEM INTERNODE CROSS SECTION:



Hollow



Semi-solid



Solid

5. _____ Stem: Internode: Number of Nodes

6. _____ Stem: Peduncle Type:

- | | |
|---------------|---------------------------|
| 1. Erect | 2. Semi-Erect to Erect |
| 3. Semi-Erect | 4. Recurved to Semi-Erect |
| 5. Recurved | 6. Other (Specify) |

7. _____ Peduncle Length (cm)

8. _____ Auricle Anthocyanin:

- | | |
|-----------|------------|
| 1. Absent | 2. Present |
|-----------|------------|

9. _____ Auricle Hairiness:

- | | | |
|--------------------|------------|--------|
| 1. Absent | 2. Present | 3. Mix |
| 4. Other (Specify) | | |

VI. HEAD:

1. _____ Head Density at Maturity:

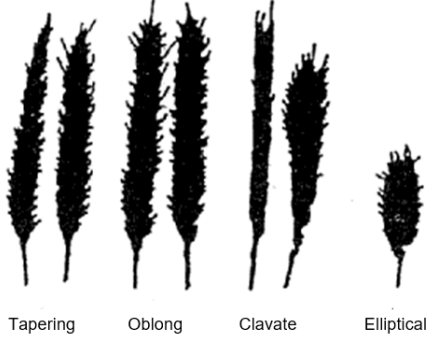
- | | |
|--------------------------|-----------------------------------|
| 1. Lax | 2. Lax to Mid-Dense (Laxidense) |
| 3. Mid-Dense (Laxidense) | 4. Mid-Dense (Laxidense) to Dense |
| 5. Dense | 6. Other (Specify) |

VI. HEAD: (continued)

2. _____ Head Shape at Maturity:

- | | | |
|---------------|--------------------|------------|
| 1. Tapering | 2. Strap | 3. Clavate |
| 4. Elliptical | 5. Other (Specify) | |

SPIKE SHAPE:



3. _____ Head Curvature at Maturity:

- | | | |
|------------------------|----------------------|-------------|
| 1. Erect | 2. Erect to Inclined | 3. Inclined |
| 4. Inclined to Recurve | 5. Recurved | |

4. _____ Head Awnedness at Maturity:

- | | | |
|------------|-----------------------|--------------|
| 1. Awnless | 2. Apically Awnletted | 3. Awnletted |
| 4. Awned | 5. Other (Specify) | |



AWNEDNESS:

- | | | | |
|---------|--------------------|-----------|-------|
| Awnless | Apically Awnletted | Awnletted | Awned |
|---------|--------------------|-----------|-------|

VII. GLUME:

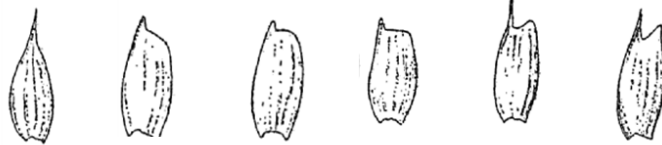
1. _____ Glume Color at Maturity:

- 1. White
- 2. Tan
- 3. Other (Specify)

2. _____ Glume Shoulder at Maturity:

- 1. Wanting
- 2. Oblique
- 3. Rounded
- 4. Square
- 5. Elevated
- 6. Apiculate
- 7. Other (Specify)

SHOULDER SHAPE:



Wanting Oblique Rounded Square Elevated Apiculate

3. _____ Glume Shoulder Width at Maturity:

- 1. Narrow
- 2. Narrow to Medium
- 3. Medium
- 4. Medium to Wide
- 5. Wide

4. _____ Glume Beak Shape at Maturity:

- 1. Obtuse
- 2. Acute
- 3. Acuminate
- 4. Acute to Obtuse
- 5. Acuminate to Acute
- 6. Acuminate to Obtuse
- 7. Other (Specify)

BEAK SHAPE:



Obtuse Acute Acuminate

5. _____ Glume Beak Length at Maturity:

- 1. Very Short
- 2. Very Short to Short
- 3. Short
- 4. Short to Medium
- 5. Medium
- 6. Medium to Long
- 7. Long
- 8. Long to Very Long
- 9. Very Long

6. _____ Glume Beak Length at Maturity (cm)

VII. GLUME: (continued)

7. _____ Glume Beak Width:

- | | | |
|-------------------|---------------------|-----------|
| 1. Narrow | 2. Narrow to Medium | 3. Medium |
| 4. Medium to Wide | 5. Wide | |

8. _____ Glume Beak Width at Maturity (cm)

9. _____ Glume Length at Maturity:

- | | | |
|--------------------|--------------------|------------------|
| 1. Short (~7mm) | 2. Short to Medium | 3. Medium (~8mm) |
| 4. Medium to Long | 5. Long (~9mm) | 6. Very Long |
| 7. Other (Specify) | | |

10. _____ Glume Width at Maturity:

- | | |
|--------------------|---------------------|
| 1. Narrow (~3mm) | 2. Narrow to Medium |
| 3. Medium (~3.5mm) | 4. Medium to Wide |
| 5. Wide (~4mm) | 6. Other (Specify) |

11. _____ Glume Pubescence at Maturity:

- | | |
|-----------|------------|
| 1. Absent | 2. Present |
|-----------|------------|

VIII. SEED:

1. _____ Seed Shape:

- | | | |
|--------------------|------------------------|-----------------------|
| 1. Ovate | 2. Oval | 3. Elliptical |
| 4. Ovate to Oval | 5. Ovate to Elliptical | 6. Oval to Elliptical |
| 7. Other (Specify) | | |

SEED SHAPE:

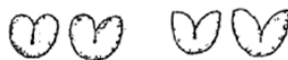


Ovate Oval Elliptical

2. _____ Seed Cheek:

- | | | |
|------------|------------|--------|
| 1. Rounded | 2. Angular | 3. Mix |
|------------|------------|--------|

CHEEK SHAPE:



Rounded Angular

VIII. SEED: (continued)

3. _____ Seed Brush:

- 1. Short
- 2. Short to Medium
- 3. Medium
- 4. Medium to Long
- 5. Long

BRUSH HAIR LENGTH:



Short Medium Long

4. _____ Seed Brush Collar:

- 1. Not Collared
- 2. Collared

BRUSH SIZE



Small Midsized Large Collared

5. _____ Seed Crease Width:

- 1. Narrow (Width of 60% or Less of Kernel)
- 2. Narrow to Mid-wide
- 3. Mid-Wide (Width of 80% or Less of Kernel)
- 4. Mid-wide to Wide
- 5. Wide (Nearly as Wide as Kernel)

SEED CREASE WIDTH:



Narrow Mid-wide Wide

VIII. SEED: (continued)

6. _____ Seed Crease Depth:

- | | |
|--|------------------------|
| 1. Shallow (Depth 20% or Less of Kernel) | 2. Shallow to Mid-deep |
| 3. Mid-deep (Depth of 25% or Less of Kernel) | 4. Mid-deep to Deep |
| 5. Deep (Depth of 50% or Less of Kernel) | |

SEED CREASE DEPTH:



Shallow

Mid-Deep

Deep

7. _____ Seed Color:

- | | | |
|--------------------|----------|--------|
| 1. White | 2. Amber | 3. Red |
| 4. Other (Specify) | | |

8. _____ Seed Texture:

- | | | |
|--------------------|---------|-----------------|
| 1. Hard | 2. Soft | 3. Intermediate |
| 3. Other (Specify) | | |

9. _____ Seed Phenol Reaction (See Instructions for More Information):

- | | |
|----------------|--------------------|
| 1. Ivory | 2. Fawn |
| 3. Light Brown | 4. Dark Brown |
| 5. Black | 6. Other (Specify) |

10. _____ Seed Weight (g per 1000 Seeds, Whole Number Only)

11. _____ Seed Germ Size

- | | | |
|--------------------|--------------------|-----------|
| 1. Small | 2. Small to Medium | 3. Medium |
| 4. Medium to Large | 5. Large | |

GERM (EMBRYO) SIZE:



Small

Midsized

Large

IX. DISEASE:

1. Disease: Please Indicate the Specific Race or Strain Tested

(0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Intermediate, 4 = Tolerant)

1. ____ Stem Rust (*Puccinia graminis* 6. sp. *tritici*) Race:
2. ____ Leaf Rust (*Puccinia recondita* 6. sp. *tritici*) Race:
3. ____ Stripe Rust (*Puccinia striiformis*) Race:
4. ____ Loose Smut (*Ustilago tritici*) Race:
5. ____ Powdery Mildew (*Erysiphe graminis* 6. sp. *tritici*) Race:
6. ____ Common Bunt (*Tilletia tritici* or *T. laevis*) Race:
7. ____ Dwarf Bunt (*Tilletia controversa*) Race:
8. ____ Karnal Bunt (*Tilletia indica*) Race:
9. ____ Flag Smut (*Urocystis agropyri*) Race:
10. ____ Tan Spot (*Pyrenophora tritici-repentis*) Race:
11. ____ Halo Spot (*Selenophoma donacis*) Race:
12. ____ *Septoria* spp. Race:
13. ____ *Septoria nodorum* (Glume Blotch) Race:
14. ____ *Septoria avenae* (Speckled Leaf Disease) Race:
15. ____ *Septoria tritici* (Speckled Leaf Blotch) Race:
16. ____ Scab (*Fusarium* spp.) Race:
17. ____ "Snow Molds" Race:
18. ____ Kernel Smudge ("Black Point") Race:
19. ____ Common Root Rot (*Fusarium*, *Cochliobolus* and *Bipolaris* spp.) Race:
20. ____ Barley Yellow Dwarf Virus (BYDV) Race:
21. ____ Rhizoctonia Root Rot (*Rhizoctonia solani*) Race:
22. ____ Soilborne Mosaic Virus (SBMV) Race:
23. ____ Black Chaff (*Xanthomonas campestris* pv. *translucens*) Race:
24. ____ Wheat Yellow (Spindle Streak) Mosaic Virus Race:
25. ____ Bacterial Leaf Blight (*Pseudomonas syringae* pv. *syringae*) Race:
26. ____ Wheat Streak Mosaic Virus (WSMV) Race:
27. ____ Take-All Race:
28. ____ Foot-Rot Race:
29. ____ Brown Necrosis Race:
30. ____ Cephalosporium Race:

IX. DISEASE: (continued)

1. Disease: Please Indicate the Specific Race or Strain Tested (continued)

(0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Intermediate, 4 = Tolerant)

31. ____ Ergot Race:
32. ____ Fusarium spp. Race:
33. ____ Other (Specify) Race:
34. ____ Other (Specify) Race:
35. ____ Other (Specify) Race:
36. ____ Other (Specify) Race:

2. Homozygous for Specific Disease Resistance Gene

(0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Intermediate, 4 = Tolerant)

1. ____ Stem rust
2. ____ Stripe rust
3. ____ Leaf rust
4. ____ Other (Specify)

X. PESTS:

1. INSECT: PLEASE SPECIFY BIOTYPE (Where Needed)

(0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Intermediate, 4 = Tolerant)

1. ____ Stem Sawfly (*Cephus* spp.) (Specify)
2. ____ Cereal Leaf Beetle (*Oulema melanopa*) (Specify)
3. ____ Russian Aphid 1 (*Diuraphis noxia*)
4. ____ Russian Aphid 2 (*Diuraphis noxia*)
5. ____ Greenbug (*Schizaphis graminum*) (General)
6. ____ Greenbug (*Schizaphis graminum*) Biotype A
7. ____ Greenbug (*Schizaphis graminum*) Biotype B
8. ____ Greenbug (*Schizaphis graminum*) Biotype C
9. ____ Greenbug (*Schizaphis graminum*) Biotype E
10. ____ Greenbug (*Schizaphis graminum*) Other (Specify)
11. ____ Aphids (Specify)
12. ____ Other (Specify)
13. ____ Hessian Fly (*Mayetiola destructor*) Biotype A
14. ____ Hessian Fly (*Mayetiola destructor*) Biotype B
15. ____ Hessian Fly (*Mayetiola destructor*) Biotype C

X. PESTS: (continued)

1. INSECT: PLEASE SPECIFY BIOTYPE (Where Needed)

(0 = Not Tested, 1 = Susceptible, 2 = Resistant, 3 = Intermediate, 4 = Tolerant)

- 16. ____ Hessian Fly (*Mayetiola destructor*) Biotype D
- 17. ____ Hessian Fly (*Mayetiola destructor*) Biotype E
- 18. ____ Hessian Fly (*Mayetiola destructor*) Biotype F
- 19. ____ Hessian Fly (*Mayetiola destructor*) Biotype G
- 20. ____ Hessian Fly (*Mayetiola destructor*) Biotype GP
- 21. ____ Hessian Fly (*Mayetiola destructor*) Biotype H
- 22. ____ Hessian Fly (*Mayetiola destructor*) Biotype I
- 23. ____ Hessian Fly (*Mayetiola destructor*) Biotype J
- 24. ____ Hessian Fly (*Mayetiola destructor*) Biotype L
- 25. ____ Hessian Fly (*Mayetiola destructor*) Biotype M
- 26. ____ Hessian Fly (*Mayetiola destructor*) Biotype N
- 27. ____ Hessian Fly (*Mayetiola destructor*) Biotype O
- 28. ____ Hessian Fly (*Mayetiola destructor*) (specify)

XI. ADDITIONAL INFORMATION:

1. High Molecular Weight Glutenin Subunit Profile (Check those that apply):

Glu-A1	Glu-B1	Glu-D1
1	6+8	2+11
2*	7+8	2+12
null	7+9	3+12
1*	13+16	5+10
	13+19	null
	17+18	

2. Translocations

(1=Present, 2=Absent, 3=Heterogeneous, 4= Not Tested):

____ 1BL/1RS	____ 1A/1R	____ 2NS/2AS	____ 4DL/4AgS
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4

XI. ADDITIONAL INFORMATION: (continued)

3. Herbicide Tolerance:

(1=Present 2=Absent 3=Not Tested)

A. Imadazolinone Tolerance Genes:

1. ____ Als-1

2. ____ Als-2

3. ____ Als-3

B. Quizalofop Tolerance Genes:

1. ____ ACC-A1

2. ____ ACC-B1

3. ____ ACC-D1

4. End Use Quality:

1. Grain Protein _____

2. Flour Protein _____

3. SDS _____

4. Farniograph _____

5. Other _____

[PLEASE ENTER ADDITIONAL VARIETY TRAITS ON NEXT PAGE]

Disease Resistance:

Insect Resistance:

Comments:

For more information and guidance:
UPOV GUIDELINES FOR THE CONDUCT OF TESTS FOR DISTINCTNESS, UNIFORMITY AND STABILITY TG/003
<https://www.upov.int/edocs/tgdocs/en/tg003.pdf>

References:

- (a) L.W. Briggie and L.P. Reitz. 1963. Classification of Triticum Species and Wheat Varieties Grown in the United States. Technical Bulletin 1278. United States Department of Agriculture.
- (b) W.5. Walls. 1965. A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity. Contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts.