

AGRONOMY

Purpose

The Agronomy CDE is designed to motivate students to learn about crop production and factors that influence the quality of seed and forage crops.

Objectives

Students participating in the Agronomy CDE should develop the following skills and abilities:

- I. To identify weeds and crops by the seed or plant parts.
- II. To evaluate the quality of crop seed and hay samples for feeding, planting, or processing for food.
- III. To identify weeds as prohibited, noxious, or common, and length of life cycle.
- IV. To develop an understanding of the biological principles underlying production practices of major crops and of their handling for further marketing.

Crosswalk with Show-Me Standards

| Objectives – Students participating in the Career Development Event should be able to: | | Show-Me Standards | |
|--|--|-------------------------------------|-------------------------------|
| | | Knowledge Standards (Content Areas) | Performance Standards (Goals) |
| 1. | To identify weeds and crops by the seed or plant parts. | SC.3, SC.4, SC.8 | 3.1 |
| 2. | To evaluate the quality of crop seed and hay samples for feeding, planting, or processing for food. | | 4.4, 4.8 |
| 3. | To identify weeds as prohibited, noxious, or common, and length of life cycle. | | |
| 4. | To develop an understanding of the biological principles underlying production practices of major crops and of their handling for further marketing. | | |

| CORRESPONDING SECONDARY AGRICULTURE CURRICULUM | | | |
|--|---|-----------------|--|
| Course and/or Curriculum: | Agricultural Science II Advance Crop Science | Unit(s): | Crop Science, Plant Science All Units |

Event Format

The Agronomy CDE shall consist of the following three sections and seven components:

Section A. Identification – Two Hours

I. SEED IDENTIFICATION-- One Hour

- A. Contestants will identify 50 crops & weeds by seed samples from the Plant Identification List (Agronomy Reference 1).
- B. The life cycle for each seed will be identified as Winter Annual, Summer Annual, Biennial, or Perennial.
- C. No more than one seed from any species.

II. PLANT IDENTIFICATION – One Hour

- A. Contestants will identify 50 crops & weeds by plant samples from the Plant Identification List (Agronomy Reference 1).
- B. The life cycle for each plant will be identified as Winter Annual, Summer Annual, Biennial, or Perennial.
- C. No more than one plant from any species.

Section B. Judging Disorders - One Hour

III. PLANT DISORDERS PRACTICUM

Ten samples will be identified according to category, causal agent and damage location. Refer to the Agronomic Disorders Practicum Scorecard (Student Copy 4) for the category, agent and damage location lists. Note: A Causal Agent may be used more than once, but not as an exact duplicate. Example: One soybean sample might exhibit anthracnose as a fungal agent; another soybean sample might exhibit brown stem rot as a fungal agent.

Disorders

| <u>Category:</u> | <i>Cultural</i> | <i>Biological</i> | <i>Environmental</i> |
|-----------------------------|---|---|--|
| <i>Causal Agent:</i> | <i>Nutritional</i> <i>Chemical</i> <i>Mechanical</i> <i>Compaction</i> | <i>Fungus</i> <i>Nematodes</i> <i>Virus</i> <i>Bacteria</i> <i>Insect</i> | <i>Moisture</i> <i>Frost</i> <i>Wind</i> <i>Drought</i> <i>Hail</i> <i>Lightning</i> <i>Pollution</i> <i>Sun Scald</i> <i>Heat</i> |

| | |
|--------------------------------|--|
| <i>Damage Location:</i> | <i>Reproductive</i> <i>Vegetative</i> <i>Vascular</i> <i>More Than</i> <i>One Area</i> |
|--------------------------------|--|

IV. WRITTEN TEST

- A. A 50 question objective type test covering well established production practices and information contained in the references will be used. Hay analysis scenario questions may be included in the written test. No more than 5 questions will come from the Current Event Fact Sheet (Updated annually by the CDE Committee and Superintendent and published on DESE CDE Handbook Website)
- B. Biological principles underlying production practices of major crops will be emphasized to include the following: variety selection, propagation, life of plant (annual, biennial, and perennial), soil and climatic adaption, cultural practices affecting crop growth and quality, disease resistance, insect relations, and principle uses. Problems on chemical application and seeding rate may also be included.
- C. Soil requirements and climatic adaptation and uses of miscellaneous crops will include tobacco, rice, winter vetch, millet, sunflower, and crown vetch.
- D. Questions over weeds will include classification, life of plant, propagation, and means of control. **Weeds to be covered are limited to the following from each class** (Missouri Plant Industries Seed Regulations 2 CSR 70-35.010 will be used as the official guide):
 1. **Prohibited** *--Field bindweed, Johnsongrass, musk thistle.
 2. **Noxious** ** --Black nightshade, buckhorn plantain, curly dock, giant foxtail, hedge bindweed, red sorrel, wild garlic/wild onion.
 3. Common--Barnyard grass, broomsedge, bull thistle, cheat/downy brome grass, chicory, climbing milkweed, cocklebur, common chickweed, common milkweed, common (broadleaf) plantain, common purslane, common ragweed, , daisy fleabane, dandelion, fall panicum, field pennycress, giant ragweed, goosegrass, henbit, horse nettle, horseweed/marestail, ironweed, jimson weed, lambsquarter, morning glory, oxeye daisy, Palmer Amaranth, Pennsylvania smartweed, pigweed, pokeberry, prickly lettuce, prickly sida, Serecia lespedeza, shepherd's purse, spotted knapweed, teaselvelvetleaf, wild carrot, wild mustard/yellow rocket, yellow foxtail, Yellow nutsedge, water hemp.

V. PROBLEM SOLVING

A. Two (2) problem solving questions will be completed by the contestants. Each problem will have 10 questions valued at 5 points each for a total of 50 points. Problems will be included as part of the written test and must be from the following categories:

1. Fertilizer Calculations
2. Chemical Tank Mix

Agronomy Formulation Practicum Pesticide Labels

These pesticides are presented to be paired with the formulation practicum.

These labels are now available in PDF version as appendix on the MO FFA site under Agronomy

Round up

24-D amine

24-D Ester (LV4)

Remedy Ultra

Mustang Max

Trivapro

Dicamba

Event Scoring

| Event | Points Possible | |
|--------------------------------------|--|----------------|
| 1. Seed Identification | 200 Points | 1 hour |
| | - 50 Crop & Weed Seed samples @ 3 points each | |
| | - Life cycle @ 1 pt each (see NOTE 1 below) | |
| 2. Plant Identification | 200 points | 1 hour |
| | - 50 Crop & Weed Plant samples @ 3 points each | |
| | - Life cycle @ 1 pt each (see NOTE 1 below) | |
| 3. Problem Solving & Plant Disorders | 150 Points | 1 hour |
| | - Two (2) problems @ 50 points each (100 pts) | |
| | - Ten Disorders @ 5 points each | |
| 4. Test | 150 Points | 1 hour |
| | - 50 multiple choice questions @ 3 points each (150 pts) | |
| TOTAL | 700 Points | 4 hours |

NOTE 1: The life cycle for each plant and/or seed will be identified as Winter Annual, Summer Annual, Biennial, or Perennial (1 point each). The scoring of the Agronomy CDE will be that the crop plant or seed ID and the weed plant or seed ID **MUST BE CORRECT** in order to receive points for the life cycle. Therefore if:

Sample identified correctly and life cycle correct = 4 points

Sample identified correctly and life cycle incorrect = 3 points

Sample identified incorrectly and life cycle correct = 0 points

Event Rules and Regulations

1. Contestants are not allowed to communicate with other contestants during the event.
2. Contestants will not be allowed to handle plant or weed samples. Contestants may bring and use a magnifying glass to view samples.
3. No instructor or student may obtain any plants, seeds, contaminants, or other materials from the CDE superintendent, Weed Science Unit, or Bradford Research Farm after **the last district contest** prior to state competition. (This includes workshops and district events which may be presented throughout the state). Questions, which would result in a competitive advantage for one or more schools, will not be answered prior to state competition.

Test References

Advanced Crop Science (Instructor Packet 10-1002-I) (2000), University of Missouri, Instructional Materials Laboratory, available on the DESE website under the Plant Science curriculum tab.

Plant Science Unit (Instructor Packet 10-1005-I). University of Missouri, Instructional Materials Laboratory, available on the DESE website under the Plant Science curriculum cont tab.

Preparing for the International Certified Crop Adviser Exam Manual. Available from International Plant Nutrition Institute, <http://www.ipni.net/>

A Subcommittee selected by the State CDE Committee annually will identify 6 articles from the Missouri Ruralist from the previous calendar year by February 1st of the current year.

Practicum References

Purdue Extension

Corn and Soybean Field Guide

National Pesticide Applicator Certification Core Manual (MX328), Appendix C – Conversions & Calculations Chapter 11 – Calculating Areas & Calculating Application Rates.

Weeds of the North Central States (1981). North Central Region Publication 281 and Circular 772, Illinois Agricultural Experiment Station, Urbana, IL, 303 pp.

Forms

See Plant Identification List (Agronomy Reference 1), Agronomy Disorders Pathogen List (Agronomy Reference 2), Plant Identification List (Student Copy 1), Agronomic Disorders (Student Copy 2).

PLANT IDENTIFICATION LIST

The following list will serve as the **official classification** in regards to **Winter Annual (WA), Summer Annual (SA), Biennial (B), Perennial (P)** for the Crop and Weed Plants & Seeds used in the Agronomy CDE:

| | | | | | |
|----------------------------|----|----------------------------|----|--------------------------------|----|
| 00. Alfalfa | P | 34. Giant ragweed | SA | 67. Rye | WA |
| 01. Barley | WA | 35. Goose Grass | SA | 68. Serecia Lespedeza | P |
| 02. Barnyard grass | SA | 36. Grain Sorghum | SA | 69. Shepherd's purse | WA |
| 03. Bermuda grass | P | 37. Hairy vetch | WA | 70. Smooth brome grass | P |
| 04. Big Bluestem | P | 38. Hedge bindweed (plant) | P | 71. Sowthistle | SA |
| 05. Birdsfoot trefoil | P | 39. Henbit | WA | 72. Soybean | SA |
| 06. Black nightshade | SA | 40. Horse nettle | P | 73. Spotted Knapweed | B |
| 07. Broomsedge | P | 41. Horseweed/marestail | SA | 74. Sunflower | SA |
| 08. Buckhorn plantain | P | 42. Indian grass | P | 75. Sweet clover | B |
| 09. Buckwheat | SA | 43. Ironweed | P | 76. Switch grass | P |
| 10. Bull thistle | B | 44. Jimson weed | SA | 77. Tall fescue | P |
| 11. Cheat/Downy Bromegrass | WA | 45. Johnson grass | P | 78. Teasel | P |
| 12. Chicory | P | 46. Kentucky bluegrass | P | 79. Tillage Radish (plant) | SA |
| 13. Climbing milkweed | P | 47. Korean lespedeza | SA | 80. Timothy | P |
| 14. Cocklebur | SA | 48. Lambsquarter | SA | 81. Velvetleaf | SA |
| 15. Common chickweed | WA | 49. Large crabgrass | SA | 82. Water Hemp (plant) | SA |
| 16. Common lespedeza | SA | 50. Morning glory | SA | 83. Wheat | WA |
| 17. Common milkweed | P | 51. Musk thistle | B | 84. White clover | P |
| 18. Common plantain | P | 52. Oats | WA | 85. Wild carrot | B |
| 19. Common purslane | SA | 53. Orchard grass | P | 86. Wild garlic/onion | P |
| 20. Common ragweed | SA | 54. Oxeye daisy | P | 87. Wild mustard/Yellow Rocket | WA |
| 21. Corn | SA | 55. Palmer Amaranth(plant) | SA | 88. Yellow foxtail | SA |
| 22. Cotton | SA | 56. Pearl millet | SA | 89. Yellow Nutsedge (plant) | P |
| 23. Crimson Clover | SA | 57. Pennsylvania smartweed | SA | | |
| 24. Crown Vetch | P | 58. Perennial Ryegrass | P | | |
| 25. Curly Dock | P | 59. Pigweed | SA | | |
| 26. Daisy fleabane | SA | 60. Pokeberry | P | | |
| 27. Dandelion | P | 61. Prickly lettuce | SA | | |
| 28. Eastern gamma grass | P | 62. Prickly sida | SA | | |
| 29. Fall panicum | SA | 63. Red clover | P | | |
| 30. Field bindweed | P | 64. Red sorrel | P | | |
| 31. Field Pennycress | WA | 65. Reed canary grass | P | | |
| 32. Forage Turnip (plant) | SA | 66. Rice | SA | | |
| 33. Giant foxtail | SA | | | | |
| | | | | | |
| | | | | | |

Agronomy CDE Disorders Pathogen List

Corn:

- Fungus
 - Rust (Southern or Common)
 - Grey Leaf Spot
 - Northern Corn Leaf Blight
 - Common Smut
 - Stalk Rot (Fusarium or Anthracnose)
 - Tar Spot
- Bacteria
 - Goss's Wilt
 - Bacterial Leaf Streak
- Virus
 - Dwarf Mosaic Virus

Soybean:

- Fungus
 - Cercospora
 - Frog Eye Leaf Spot
 - Soybean Rust
 - Soybean Sudden Death Syndrome (SDS)
 - Damping Off (Pythium)
- Bacteria
 - Soybean Bacterial Leaf Blight
- Virus
 - Soybean Mosaic Virus
- Nematode
 - Soybean Cyst Nematodes

Wheat:

- Fungus
 - Rust (Leaf, Stripe, Stem)
 - Powdery Mildew
 - Septoria Leaf Blotch
 - Fusarium Head Blight (Scab)
- Bacteria
 - Black Chaff
- Virus
 - Mosaic (Spindle Streak, White Streak)

Plant Identification List

Student Copy 1

| | | |
|----------------------------|----------------------------|--------------------------------|
| 00. Alfalfa | 33. Giant foxtail | 67. Rye |
| 01. Barley | 34. Giant ragweed | 68. Serecia Lespedeza |
| 02. Barnyard grass | 35. Goose Grass | 69. Shepherd's purse |
| 03. Bermuda grass | 36. Grain Sorghum | 70. Smooth brome grass |
| 04. Big Bluestem | 37. Hairy vetch | 71. Sowthistle |
| 05. Birdsfoot trefoil | 38. Hedge bindweed | 72. Soybean |
| 06. Black nightshade | 39. Henbit | 73. Spotted Knapweed |
| 07. Broomsedge | 40. Horse nettle | 74. Sunflower |
| 08. Buckhorn plantain | 41. Horseweed/marestail | 75. Sweet clover |
| 09. Buckwheat | 42. Indian grass | 76. Switch grass |
| 10. Bull thistle | 43. Ironweed | 77. Tall fescue |
| 11. Cheat/Downy Bromegrass | 44. Jimson weed | 78. Teasel |
| 12. Chicory | 45. Johnson grass | 79. Tillage Radish (plant) |
| 13. Climbing milkweed | 46. Kentucky bluegrass | 80. Timothy |
| 14. Cocklebur | 47. Korean lespedeza | 81. Velvetleaf |
| 15. Common chickweed | 48. Lambsquarter | 82. Water Hemp (plant) |
| 16. Common lespedeza | 49. Large crabgrass | 83. Wheat |
| 17. Common milkweed | 50. Morning glory | 84. White clover |
| 18. Common plantain | 51. Musk thistle | 85. Wild carrot |
| 19. Common purslane | 52. Oats | 86. Wild garlic/onion |
| 20. Common ragweed | 53. Orchard grass | 87. Wild mustard/Yellow Rocket |
| 21. Corn | 54. Oxeye daisy | 88. Yellow foxtail |
| 22. Cotton | 55. Palmer Amaranth(plant) | 89. Yellow Nutsedge (plant) |
| 23. Crimson Clover | 56. Pearl millet | |
| 24. Crown Vetch | 57. Pennsylvania smartweed | |
| 25. Curly Dock | 58. Perennial Ryegrass | |
| 26. Daisy fleabane | 59. Pigweed | |
| 27. Dandelion | 60. Pokeberry | |
| 28. Eastern gamma grass | 61. Prickly lettuce | |
| 29. Fall panicum | 62. Prickly sida | |
| 30. Field bindweed | 63. Red clover | |
| 31. Field Pennycress | 64. Red sorrel | |
| 32. Forage Turnip (plant) | 65. Reed canary grass | |
| | 66. Rice | |

AGRONOMIC DISORDERS PRACTICUM SCORECARD

Student Copy 2

Name: _____ Contestant Number: _____

School: _____ School Number: _____

| | | Possible | | |
|-------------|-------------------------|----------|--------|-------|
| | | Answer | Points | Score |
| 1. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 2. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 3. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 4. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 5. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 6. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 7. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 8. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 9. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| 10. | Causal Category: | | 2 | |
| | Agent: | | 2 | |
| | Part of Plant Affected: | | 1 | |
| Total Score | | | 50 | |

| Possible Answers | |
|-------------------------|--------------------|
| Causal Category: | |
| A. | Biological |
| B. | Cultural |
| C. | Environmental |
| | |
| Agents: | |
| 01 | Bacteria |
| 02 | Chemical |
| 03 | Compaction |
| 04 | Drought |
| 05 | Frost Damage |
| 06 | Fungus |
| 07 | Hail |
| 08 | Heat |
| 09 | Insect |
| 10 | Lightning |
| 11 | Mechanical |
| 12 | Moisture |
| 13 | Nematodes |
| 14 | Nutritional |
| 15 | Pollution |
| 16 | Sun scald |
| 17 | Virus |
| 18 | Wind damage |
| | |
| Damage Location: | |
| A. | Reproductive parts |
| B. | Vegetative parts |
| C. | Vascular Bundles |
| D. | More than one |