

**2008 NACTA  
Crops Judging Contest**

**Faculty Contact** – Dr. David Kattes  
254-968-9214  
[kattes@tarleton.edu](mailto:kattes@tarleton.edu)

Dr. Hennen Cummings  
254-968-9223  
[hcummings@tarleton.edu](mailto:hcummings@tarleton.edu)

Dr. Kevin Donnelly, KSU  
785-532-6151  
[kjd@ksu.edu](mailto:kjd@ksu.edu)

**Friday, April 18, 2008 – 8:00 am**

**Location** – Joe Autry Agriculture Building on campus, Room 113

**RULES**

1. There will be a 4-year and 2-year division, with each evaluating the same components.
2. A team will consist of four members.
3. Each school may enter two teams, one official and one unofficial. Only the official teams are considered for the sweepstakes award. The official participating team must be designated prior to the start of the contest. Unofficial teams/members are eligible for awards, and their placings will NOT enter into the determination of the sweepstakes award.
4. Contestants are only eligible to compete one time in the two year division and only one time in the four year division.
5. Contestants must bring a #2 lead pencil, should bring a non-programmable handheld calculator, and a clipboard to the contest. A handheld magnifying lens may be used in the identification and on the lab practical portion. All other materials necessary will be provided. No notes, reference materials, etc. will be allowed.
6. Announcements made on the contest day will take precedent over the written rules!
7. No cell phones, pagers, or conferring during the contest will be allowed. Contestants observed in violation of this WILL be eliminated from the competition.

8. Tie Breaker
  - a. The contestant/team with the highest written exam score will be awarded the higher placing.
  - b. The contestant/team with the highest plant and seed identification score will be awarded the higher placing.
  - c. The contestant/team with the highest lab practical score will be awarded the higher placing.
  
9. Results are FINAL after they are announced!

## **CONTEST**

The contest will be divided into four areas with 600 total points as follows:

- A. Agronomic Quiz (150 points)
- B. Math Practical (150 points)
- C. Lab Practical (150 points)
- D. Plant and Seed Identification (150 points)

One hour will be allowed for completion of each section. Additional descriptions and specific rules for each section of the contest follow and will be considered official for the contest.

### **A. AGRONOMIC QUIZ**

This section will consist of a written multiple choice exam of 75 questions worth 2 points each for a total of 150 points. Both general and specific questions will be asked on production of major US grain and forage crops. The National Certified Crop Adviser (CCA) Performance Objectives will provide an excellent outline of potential topics. They are available from the American Society of Agronomy, 677 South Segoe Road, Madison, WI 53711 (608-273-8080). Topics may include:

- Crop production statistics (major world and U.S. crops) and distribution of US crops
- Crop classification terms (botanical, growth habit, crop utilization, etc.)
- Crop physiology, growth, development, and quality
- Plant morphology and anatomy
- Plant breeding and genetics
- Seed industry/technology (seed quality, certification, testing, processing and treatment, etc.)
- Planting (cultivar selection, seeding equipment, planting practices, seeding dates, replanting decisions, etc.)
- Pest problems and pest control (insects, diseases, and weeds, biology/life cycle of major crop pests, etc.)
- Pest management alternatives (IPM principles, pest scouting and monitoring, role of beneficials, etc.)
- Pesticide use (pesticide stewardship, safety and regulation, trade/common names of major crop pesticides, etc.)
- Harvesting and storage of grain and forage crops and crop products
- Management of forage crops including harvest factors and effects on forage quality
- Cropping systems and crop rotations

Crop environment (light, temperature and moisture effects on plants)  
Basic soil properties (physical, chemical, and biological)  
Soil fertility (nutrient availability, nutrient movement, plant needs for nutrients, soil pH, organic matter, etc.)  
Nutrient management (soil testing, soil test reports/recommendations, fertilizers and fertilization, liming, etc.)  
Soil water management (irrigation, drainage, erosion, leaching, evapotranspiration, conservation, etc.)  
Tillage and residue management (tillage systems, seedbed preparation, tillage tool selection, etc.)  
Site specific management concepts (GPS, GIS, VRT, grid sampling, monitoring technology, field mapping)  
Weather and climatic effects on crop production and management decisions

## **B. MATH PRACTICAL**

This section will include mathematical problems related to agronomy. It will be scored on the basis of 150 total points. Answers must be rounded off and given in correct units as specified in the problem. Critical information will be given except for commonly known conversion factors. Possible types of problems are listed below:

1. Area conversion calculations (Estimate per acre yield from harvest strips or small plots; Calculate areas and yields from irregularly shaped fields; Area covered and time required for given capacity and delivery rate of fertilizer/chemical applicator; Time to complete tillage/harvest operation given area of field, width of equipment, and speed of travel; Obtaining material and cost estimates for fencing materials for given field size, etc.)
2. Pesticide application (Calibrate broadcast or band application given number of nozzles, nozzle spacing, output from one or more nozzles, and distance traveled or intended speed of travel; Find amount of chemical formulation to add to a spray tank to meet product or active ingredient label recommendations given tank size and delivery rate; Calculate costs of pesticide application, etc.)
3. Fertilizer/lime application (Spreader calibration given amount delivered in a distance traveled or by turning the drive wheel; Fertilizer application rates given carrier analysis and recommended rates in elemental or oxide form or replacement of nutrients removed by the crop; Prepare bulk blends from given rates and available carriers; Calculate costs of fertilizer/lime application; Compare costs of different fertilizers/lime sources)
4. Seeding/Planting (Calibration of row planter or grain drill given amount of seed delivered in a distance traveled or by turning the drive wheel a certain number of revolutions; Seeding rates, plant population, and percent seed emergence calculations; Adjusting seeding rates and comparing costs based on PLS)
5. Volume calculations (tank capacity, storage volume for hay, grain bin, or silo)
6. Unit conversions (English to metric units and vice versa)
7. Concentration (ppm, %)
8. Harvest (estimating harvest losses, harvest speed, area covered)

9. Irrigation (application rate for given PSI and GPM, convert gallons to acre-inches)
10. Labor requirements (hours/acre)
11. Pasture carrying capacity (stocking rates based on animal units)
12. Soil erosion loss equation
13. Soil physical properties (bulk density, % soil moisture, water retention in profile):
14. Plant breeding (heritability, percent homozygosity, expected genotypic and phenotypic ratios from crossing)
15. Water usage (day, season, species)
16. Weed competition (seeds/acre, yield loss)
17. Yield determination and adjustment for % moisture
18. Forage quality (protein content, relative feed value)
19. Livestock rations (combining forages, grains, and supplements to target protein levels - Pierson square)
20. Heat units/degree days

### **C. LAB PRACTICAL**

This section will consist of 75 stations worth 2 points each for a total of 150 points. Each station will have photographs or actual samples of various plant materials, fertilizers, pesticides, seed samples, data tables, equipment, insects, diseases, etc. along with specific questions which will require identification, interpretation, calculation, or evaluation of the display material to answer correctly. These stations will represent activities commonly completed in laboratories or field trips in crop production and soil management courses. For example, contestants may have to:

Identify common crop diseases and disease symptoms (see attached list – copy of list will be provided to contestants during contest)

Identify common crop insects and insect damage (see attached list – copy of list will be provided to contestants during contest)

Identify common field machinery and other agronomic equipment (see attached list – copy of list will be provided to contestants during contest)

Interpret information on a pesticide label, soil test report, sprayer nozzle tip, or fertilizer bag

Recognize classes of pedigreed seed from standard seed tags and interpret information from a seed tag

Write the commercial grade and grade determining factors for market grain samples given various quality factors and official FGIS grain standards tables

Identify specific plant and seed structures, crop growth stages, or developmental characteristics on fresh or pressed plant samples

Recognize common crop nutrient deficiency symptoms (N, P, K, S, Fe) on both dicot and grass crops

Use a soil textural triangle to name soil textural class

Determine soil texture by feel, distinguish different types of soil structure, relate soil color to soil properties

Recognize common fertilizer carriers (major nutrient supplied, typical analysis, common name)

Identify and explain the purpose of items such as ag lime, inoculum, seed treatments, soil amendments, etc.

Identify stored or processed crop products and common livestock feed ingredients made from crops (silage, hay as to type, alfalfa pellets and cubes, soybean meal, cottonseed meal and hulls, wheat middlings, etc.)

Evaluate crop quality by ranking two or more samples of hay, silage, seed, or cotton

Interpret data from tables or graphs (analyze a variety trial based on the LSD mean comparison statistic, select the proper spray nozzle tip for given conditions from a manufacturer's spraying equipment manual, read a calibration nomograph for a sprayer or planter, etc.)

#### **D. CROP AND WEED PLANT AND SEED IDENTIFICATION**

1. A total of 75 specimens will be identified in a one hour time limit. Each sample will be worth 2 points for a total of 150 points
2. Crop and weed plants will be shown either as fresh or dried and pressed samples. All seed samples will be mature. Seed may be shown either hulled, or where typical, within surrounding hulls, burs or pods (ie. wild buckwheat, peanut, Korean lespedeza, rice, etc.).
3. Crop and weed identification materials will be selected from the attached identification list. Items are marked with a (p) for plants that may be shown in the flowering to mature plant stage, (v) for plants that may be shown in the vegetative stage, and (s) if seed identification is required. (Host school may add ten plants and/or seeds to the list.)
4. Plants and seeds will be identified by common name as given in the official identification list. A copy of the list will be provided to contestants during the contest. This portion will be machine graded, with the answer for each sample selected from the sequentially numbered list and entered onto the computer graded answer key.
5. Hand magnifying lenses will be allowed. Live plant specimens may be touched carefully to aid in identification, but must not be broken and destroyed by contestants or disqualification may result. Dried, pressed plant specimens cannot be touched.

## 2008 NACTA PLANT AND SEED IDENTIFICATION LIST

CODE: (p) flowering to mature stage plant (live or mount) (v) vegetative plant (live) (s) seed

### Cereal Grain Crops

1. barley (p) (v)
2. six-rowed barley (s)
3. two-rowed barley (s)
4. corn (p) (v)
5. dent corn (s)
6. flint corn (s)
7. pop corn (s)
8. sweet corn (s)
9. foxtail millet (p) (s)
10. pearl millet (p) (s)
11. proso millet (p) (s)
12. oat (p) (s) (v)
13. rice (p) (s) (v)
14. rye (p) (s) (v)
15. grain sorghum (p) (s) (v)
16. sudangrass (s)
17. triticale (p) (s)
18. wheat (p) (v)
19. durum wheat (s)
20. hard red spring wheat (s)
21. hard red winter wheat (s)
22. hard white wheat (s)
22. soft red winter wheat (s)
23. soft white wheat (s)

### Pulse Crops

24. cowpea (p) (v)
25. blackeye cowpea (s)
26. purplehull cowpea (s)
27. fieldbean (p) (v)
28. black turtle fieldbean(s)
29. great northern fieldbean (s)
30. navy fieldbean (s)
31. pinto fieldbean (s)
32. red kidney fieldbean (s)
33. fieldpea (p) (v)
34. Austrian winter fieldpea (s)
35. guar (p) (s) (v)
36. lentil (p) (s) (v)
37. green mungbean (p) (s) (v)
38. peanut (p) (s) (v)
39. soybean (p) (s) (v)

### Miscellaneous Crops

40. common buckwheat (p) (s) (v)
41. canola (p) (s) (v)
42. castor (p) (s) (v)
43. cotton (p) (s) (v)
44. crambe (p) (s) (v)
45. crotalaria (s)
46. flax (p) (s) (v)
47. potato (p) (v)
48. safflower (p) (s) (v)
49. sesame (p) (s) (v)
50. sugarbeet (p) (s) (v)
51. sunflower (p) (v)
52. confectionary sunflower (s)
53. oilseed sunflower (s)
54. tobacco (p) (s) (v)

### Forage Grasses

55. bermudagrass (p) (s) (v)
56. big bluestem (p) (s)
57. blue grama (p)
58. buffalograss (p) (s)
59. crested wheatgrass (p) (s) (v)
60. Indiangrass (p) (s)
61. Kentucky bluegrass (p) (s) (v)
62. little bluestem (p) (s)
63. orchardgrass (p) (s) (v)
64. perennial ryegrass (p) (s) (v)
65. reed canarygrass (p) (s) (v)
66. sideoats grama (p)
67. smooth brome grass (p) (s) (v)
68. switchgrass (p) (s)
69. tall fescue (p) (s) (v)
70. timothy (p) (s) (v)

### Forage Legumes

71. alfalfa (p) (s) (v)
72. alsike clover (p) (s) (v)
73. arrowleaf clover (p) (s) (v)
74. birdsfoot trefoil (p) (s) (v)
75. common vetch (p) (s) (v)
76. crimson clover (p) (s) (v)
77. crownvetch (p) (s) (v)
78. hairy vetch (p) (s) (v)
79. Korean lespedeza (p) (s) (v)
80. red clover (p) (s) (v)
81. sweetclover (p) (s) (v)
82. white clover (p) (s) (v)

**2008 NACTA PLANT AND SEED IDENTIFICATION LIST (cont.)**

Weeds

83. barnyardgrass (p) (s) (v)
84. blackseed plantain (p) (s)
85. bracted plantain (p) (s)
86. buckhorn plantain (p) (s)
87. buffalobur (p) (s) (v)
88. Canada thistle (p) (s) (v)
89. cheat (p) (s)
90. common lambsquarters (p) (s) (v)
91. chickweed (p) (s) (v)
92. cocklebur (p) (s) (v)
93. common ragweed (p) (s) (v)
94. curly dock (p) (s) (v)
95. dandelion (p) (s) (v)
96. dodder (p) (s) (v) (at least 25% of sample)
97. downy brome (p) (s) (v)
98. eastern black nightshade (p) (s)
99. field pennycress (p) (s)
100. field bindweed (p) (s) (v)
101. giant ragweed (p) (s) (v)
102. goosegrass (p) (s)
103. greenflower pepperweed (p) (s)
104. green foxtail (p) (s)
105. hedge bindweed (p)
106. henbit (p) (s) (v)
107. hoary cress (p) (s)
108. horsenettle (p) (s)
109. jimsonweed (p) (s) (v)
110. johnsongrass (p) (s)
111. jointed goatgrass (p) (s)
112. kochia (p) (s) (v)
113. leafy spurge (p) (s)
114. large crabgrass (p) (s) (v)
115. little barley (p) (s)
116. musk thistle (p) (s) (v)
117. Pennsylvania smartweed (p) (s)
118. perennial sowthistle (p) (s) (v)
119. prickly sida (p) (s) (v)
120. puncturevine (p) (s) (v)
121. quackgrass (p) (s) (v)
122. redroot pigweed (p) (s) (v)
123. rescuegrass (p) (s)
124. Russian knapweed (p) (s)
125. Russian thistle (p) (s) (v)
126. shepherdspurse (p) (s)
127. sicklepod (p) (s) (v)
128. silverleaf nightshade (p)
129. tall morningglory (p) (s) (v)
130. tall waterhemp (p) (v)
131. velvetleaf (p) (s) (v)

Weeds (cont.)

132. Venice mallow (p) (s) (v)
133. wild carrot (p) (s) (v)
134. wild buckwheat (p) (s) (v)
135. wild mustard (s)
136. wild oat (p) (s)
137. wild sunflower (p) (s)
138. yellow foxtail (p) (s) (v)
139. yellow nutsedge (p) (v)

Additional Plants

140. common yellow woodsorrel (p) (s) (v)
141. field sandbur (p) (s) (v)
142. hairy bittercress (p) (v)
143. honey mesquite (p) (v)
144. horseweed (p) (v)
145. red berry juniper (p) (v) (“cedar”)
146. khakiweed (p) (v)
147. prickly pear cactus (p) (v)
148. purple nutsedge (p) (s) (v)
149. redstem filaree (p) (v)

**2008 NACTA CROP DISEASE IDENTIFICATION LIST (on lab practical)**

Samples indicated (s) will be shown on seed only

Small Grains

- 150. powdery mildew  
(shown on any small grain)
- 151. stem rust  
(shown on wheat or oat)
- 152. leaf rust  
(shown on wheat or oat)
- 153. loose smut  
(shown on wheat, barley, or oat)
- 154. barley yellow dwarf mosaic  
(shown on wheat or barley)
- 155. ergot  
(shown on any small grain head or in seed)
- 156. black point of wheat (s)
- 157. common bunt (s)
- 158. wheat scab (s)

Corn

- 159. common corn smut
- 160. ear rot
- 161. gray leaf spot
- 162. northern corn leaf blight
- 163. southern corn leaf blight
- 164. Gibberella stalk rot
- 165. Fusarium stalk rot

Soybean

- 166. bacterial blight
- 167. brown stem rot
- 168. Phytophthora root rot
- 169. pod and stem rot
- 170. bean pod mottle (s)
- 171. purple stain (s)
- 172. Asian rust

Cotton

- 173. bacterial blight
- 174. Verticillium wilt

Peanut

- 175. Cercospora leaf spot
- 176. Sclerotinia blight

Sorghum

- 177. charcoal rot
- 178. gray leaf spot
- 179. maize dwarf mosaic

Alfalfa

- 180. bacterial wilt
- 181. leaf spot
- 182. Phytophthora root rot

**2008 NACTA EQUIPMENT IDENTIFICATION LIST (on lab practical)**

- |  |   |
|--|---|
| 183. anhydrous ammonia applicator      | 204. hay baler                          |
| 184. bale wrapper                      | 205. hay moisture tester                |
| 185. bermudagrass sprigger             | 206. hay rake                           |
| 186. Boerner divider                   | 207. laser land plane                   |
| 187. broadcast fertilizer spreader     | 208. moldboard plow                     |
| 188. broadcast seeder                  | 209. offset disk                        |
| 189. Carter dockage tester             | 210. peanut digger/shaker               |
| 190. chisel plow                       | 211. rod weeder                         |
| 191. combine yield monitor system      | 212. rotary hoe                         |
| 192. cotton picker                     | 213. rotary mower                       |
| 193. cultipacker seeder                | 214. rotary tiller                      |
| 194. drainage tile installation system | 215. row crop cultivator                |
| 195. field cultivator                  | 216. row crop planter                   |
| 196. field sprayer                     | 217. self unloading forage wagon        |
| 197. forage chopper                    | 218. soil probe                         |
| 198. forage probe                      | 219. spiketooth harrow                  |
| 199. global positioning system         | 220. subsoiler                          |
| 200. grain combine                     | 221. swather/windrower                  |
| 201. grain drill                       | 222. tandem disk                        |
| 202. grain moisture tester             | 223. variable rate control system       |
| 203. grain trier                       | 224. Winchester bushel weight apparatus |

**2008 NACTA INSECT IDENTIFICATION LIST (on lab practical)**

CODE: (a) adult stage (l) larval stage

Alfalfa

- 225. alfalfa weevil (a) (l)
- 226. blue alfalfa aphid (a)
- 227. pea aphid (a)
- 228. spotted alfalfa aphid (a)
- 229. potato leaf hopper (a)

Cotton

- 230. boll weevil (a)
- 231. cotton bollworm (l)
- 232. lygus bug (a)

Corn

- 233. European corn borer (a) (l)
- 234. Southwestern corn borer (l)
- 235. corn earworm (l)
- 236. corn rootworm (l)
- 237. northern corn rootworm (a)
- 238. southern corn rootworm (a)
- 239. western corn rootworm (a)

Soybean

- 240. green stinkbug (a)
- 241. soybean cyst nematode (a)
- 242. green cloverworm (l)
- 243. bean leaf beetle (a)

Sorghum

- 244. chinch bug (a)
- 245. corn leaf aphid (a)

Small grains

- 246. greenbug (a)
- 247. Russian wheat aphid (a)
- 248. Hessian fly (l)

Stored grain

- 249. granary weevil (a)
- 250. sawtoothed grain beetle (a)
- 251. lesser grain borer (a)
- 252. red flour beetle (a)
- 253. Indian meal moth (a) (l)

Miscellaneous

- 254. black cutworm (l)
- 255. blister beetle (a)
- 256. Colorado potato beetle (a) (l)
- 257. fall armyworm (l)
- 258. grasshopper (a)
- 259. spider mite (a)
- 260. thrips (a)
- 261. white grub (a) (l)
- 262. wireworm (l)

Beneficials

- 263. lady beetle (a) (l)
- 264. lacewing (a)
- 265. parasitic wasp (a)