



2016 NCWSS Weed Contest

The purpose of the NCWSS Collegiate Weed Science Contest is to provide an educational experience for college students interested in Weed Science. The contest offers networking opportunities with university faculty, researchers, industry representatives, and fellow students. Students can apply and expand their weed science knowledge in a practical setting. Participating in this contest will provide you with a valuable experience and recognition for your future career endeavors. Finally, this contest aims at increasing the visibility on the current and future importance of Weed Science for the agricultural industry.

CONTEST RULES

Note: Student cell phones or other communication devices will not be permitted during the day of the contest. Any violation of this rule may result in disqualification of that student from the contest.

A. Eligibility

Any undergraduate or graduate student currently enrolled and pursuing an A.S., B.Sc., M.Sc., or Ph.D. is eligible to participate. Eligibility includes A.S. students, including 2-year schools, who will compete as undergraduate individuals and teams. ***Each team will consist of three or four students. If a team has four students, the top three total scores will be used to calculate a team score. If a team has three students, all three scores will be used to calculate the team score.*** A team may be composed of: (a) graduates, (b) undergraduates, or (c) mixed (graduates and undergraduates). A mixed team must compete as a graduate team; however, the undergraduate students remain eligible for individual undergraduate awards. There is no restriction on the number of teams a college or university may enter in the contest. If a college or university does not have sufficient students for a team of three, students may enter as individuals.

All students graduating with an A.S. or B.Sc. degree within six months before the contest (and not actively enrolled in a graduate program) will be able to participate as an undergraduate.

B. Awards

Plaques will be awarded for the following categories:

Team – The highest team score from all events (weed identification, written test and team sprayer calibration, unknown herbicides, and problem solving) will determine the overall contest winner in both the graduate and undergraduate divisions. Second and third place teams

in each division will also be recognized. In addition, the graduate and undergraduate teams scoring highest in the team sprayer calibration event will receive a plaque.

Individual – The highest combined scores from the weed identification, written calibration test, unknown herbicides, and problem solving events will determine the overall top three graduate and top three undergraduate individual winners. The team sprayer calibration event will not count towards individual scores. Each winner will be recognized by a plaque. The highest individual scores by a graduate and an undergraduate student for each contest event (weed identification, problem solving, unknown herbicides, and written calibration test) will be recognized with a plaque.

Category:	Placing	# plaques
Graduate Team	First	4 (1 for each team member)
	Second	4 (1 for each team member)
	Third	4 (1 for each team member)
Undergraduate Team	First	4 (1 for each team member)
	Second	4 (1 for each team member)
	Third	4 (1 for each team member)
Field Calibration Graduate Team	First	4 (1 for each team member)
Field Calibration Undergraduate Team	First	4 (1 for each team member)
Graduate Individual	First	1
	Second	1
	Third	1
Undergraduate Individual	First	1
	Second	1
	Third	1
Graduate Individual Weed ID	First	1
Graduate Individual Herbicide ID	First	1
Graduate Individual Problem Solving	First	1
Graduate Individual Written Calibration	First	1
Undergraduate Individual Weed ID	First	1
Undergraduate Individual Herbicide ID	First	1
Undergraduate Individual Problem Solving	First	1
Undergraduate Individual Written Calibration	First	1

C. Events

The contest will consist of four major events.

1) WEED IDENTIFICATION

A complete list of potential species will be sent to each university and will be posted on the NCWSS weed contest website. From this list, 25 weeds will be presented in identifiable condition for the contest. Weeds may be presented in any stage of growth or development (seeds, seedlings, mature weeds or plant parts). Each weed is worth four points for a ***total of 100 points per person and 300 points for the team***. Points are given as follows: two points for the common name and its *correct spelling*, including capitalization where appropriate, e.g. Palmer amaranth, and hyphenation, e.g. poison-hemlock, and two points for the scientific name

and its *correct spelling*, including capitalizing the genus name. (Note: underlining the scientific name will not be required.) Only common names will be required for undergraduate students (scientific name is not required). The maximum deduction is four points per sample. Five additional specimens will be provided for identification as score tiebreakers. Students are allowed to touch, but not damage the plant samples. Damaging plant samples may result in disqualification. Common names, scientific names, and spellings must conform to the list sent out by the host prior to the contest. This list is based on the WSSA composite list of weeds: <http://wssa.net/weed/composite-list-of-weeds/>

2) APPLICATION TECHNOLOGY

A. Written Test on Sprayer Calibration - Questions will cover all aspects of sprayer calibration, such as volume of spray needed, amount of herbicide needed, nozzle nomenclature and selection, sprayer pressure, droplet size, boom height, drift reduction techniques, etc. The test will be comprised of multiple choice, short answer, and written calculation questions. The major reference will be the TeeJet Agricultural Spray Products Catalog from Spraying Systems Company, but other sources may be used. Test information will be provided in English or metric units, and correct answers will be accepted only in the units specified on the worksheet (could be English or metric). An English-metric conversion sheet will be provided. *Use of personal calculators will not be permitted.* Calculators will be provided by the host. A 60-minute time limit will be imposed for the written test. Time to completion will be recorded for each participant and the shortest time will be used as a score tiebreaker. This will be the first event of the contest, and all participants will take the test during this time period. ***The written portion is worth 50 points for individuals and 150 points for the team.***

B. Sprayer Calibration - Each team will calibrate a CO₂ backpack sprayer based on a written problem provided during this session. The team portion will not be used in calculating individual scores, but will be used to calculate team scores. Each team will be given a set of problems and conditions upon which a CO₂ backpack sprayer is to be calibrated based upon the application of a herbicide mixture. Change from 2013: teams are free to do calculations and work on the sprayer set up at the same time. This event is worth 200 points. All sprayer components, calculators, and stopwatches will be provided. *Use of personal calculators will not be permitted.* **Safety glasses (provided by the host) are required to be worn by all students, judges, observers, etc. who are in the calibration event area. If the judge sees any student without safety glasses during the time they are working on the problem (calculations, sprayer setup and calibration, and calibration run), the team may be disqualified from the Calibration event without a score.** Each team will be expected to choose the appropriate nozzle tips, speed, pressure, and amount of herbicide for accurate calibration and application. Each team will be asked to deliver a designated number of gallons/acre over a given length or area. Scoring will be based on accuracy of application, calibration, and elapsed time.

Time will start when the team approaches the spray table. For every twelve seconds over 10 minutes, one point will be deducted from a possible 50 points. The maximum time for completing the calculation and sprayer setup exercise (not including the calibration run and nozzle check by the judges) is 20 minutes. If a team has not finished in 20 minutes, zero points are awarded for the time factor, but the team can still be awarded points for their calculations, nozzles, spray pattern, boom height, etc. Teams will be given a set of conditions in English and/or metric units and must perform calculations to determine spray output, nozzle/screen

selection, product amounts, spray volumes, and/or active ingredient amounts. Answers will be accepted in specified units only, may be English or metric. The calculation portion is worth 20 points. When a team is ready to make the calibration run, they are to advise the judge and the time will be stopped. The calibration run is then made with the judge watching the proper boom height and uniformity of spray pattern. The calibration run is scored 10 points for boom height, 10 points for accurate walking speed, 40 points for nozzle selection, 30 points for screen selection, and 16 points for uniform spray pattern (106 points total).

Points for correct nozzle selection will be as follows: 5 points/nozzle plus 20 additional points awarded if all four nozzles are correct; no additional points awarded if any of the four nozzles are incorrect. Similarly, points for correct screen/check valve selection will be as follows: 5 points/screen plus 10 additional points awarded if all four screens are correct; no additional points if any of the four screens are incorrect. The judge will then check each nozzle for output in milliliters per minute. A $\pm 3\%$ variation per nozzle will be allowed. Each 0.5% under or over the 3% will result in loss of 0.5 points. For example, if a nozzle is producing 8% less than the calculated (correct) output, 5 points will be deducted. The sprayer output will count for 24 points.

Points breakdown:

Time factor: 50 points maximum if completed in 10 minutes (deduct 1 point for every 12 seconds over 10 minutes; zero points if not finished in 20 minutes)

Calculations: 20 points

Calibration Run (106 points possible):

Boom height: 10 points

Accurate walking speed for distance: 10 points

Nozzle selection (5/nozzle + 20 for all same nozzle): 40 points

Screen/check valve selection (5/screen + 10 for all same screen): 30 points

Uniform spray pattern: 16 points

Sprayer output (deduct 0.5 pt /each 0.5% beyond $\pm 3\%$ of target): 24 points

Total = 200 points

3) IDENTIFICATION OF UNKNOWN HERBICIDES

Crop and weed species will be planted and treated with herbicides. A list of crops, weeds and herbicide information will be sent to each university and posted on the NCWSS website. From this list, selections will be made. Students will be required to identify herbicides by visual symptoms on crops and weeds. ***This event is worth 100 points for individuals and 300 points for the team.*** Graduate students will identify the herbicides by common name, herbicide family, and site of action. Undergraduate students will write both site of action and common name, but will be scored only for correct site of action. Correct common name will be used only for a tiebreaker. There will be ten plots and each plot will be worth 10 points. For graduate students, scoring will be 5 points for correct common name, 3 points for correct herbicide family, and 2 points for correct site of action. For undergraduates, scoring will be 10 points for correct site of

action. Five additional plots will be provided for identification to break any ties. There can also be a nontreated plot, which must be identified as nontreated. Herbicide plots may be duplicated.

4) PROBLEM SOLVING AND RECOMMENDATION

Students will be required to evaluate a crop production problem in a field situation and recommend an effective solution to that problem. Recommendations must comply with accepted agricultural practices. Students should consider all factors which influence crop growth and development. Although several possible answers may be correct, the best answer considering all alternatives will be determined by a designated advisory panel. This event is to be presented and handled in a "role-playing" situation. The student will be asked to assume the role of an extension, sales, or research person when dealing with the farmer. Each student will handle only one situation and will be randomly assigned to the various problems. Points are allotted as follows:

25 points - how the student approached the farmer

45 points - assessment of situation; determine the problem

15 points - recommendation - now

15 points - recommendation - next year

This event is worth 100 points for individuals and 300 points for the team. Winners of each problem may be required to participate in a common, but different field situation to determine the overall individual winner.

2016 North Central Collegiate Weed Contest

Weed Identification List

1.	<i>Abutilon theophrasti</i>	velvetleaf
2.	<i>Acalypha ostryifolia</i>	hophornbeam copperleaf
3.	<i>Acalypha virginica</i>	Virginia copperleaf
4.	<i>Aegilops cylindrica</i>	jointed goatgrass
5.	<i>Alliaria petiolata</i>	garlic mustard
6.	<i>Amaranthus blitoides</i>	prostrate pigweed
7.	<i>Amaranthus palmeri</i>	Palmer amaranth
8.	<i>Amaranthus retroflexus</i>	redroot pigweed
9.	<i>Amaranthus rudis</i>	common waterhemp
10.	<i>Ambrosia artemisiifolia</i>	common ragweed
11.	<i>Ambrosia trifida</i>	giant ragweed
12.	<i>Apocynum cannabinum</i>	hemp dogbane
13.	<i>Asclepias syriaca</i>	common milkweed
14.	<i>Avena fatua</i>	wild oat
15.	<i>Barbarea vulgaris</i>	yellow rocket
16.	<i>Bromus japonicus</i>	Japanese brome
17.	<i>Bromus secalinus</i>	cheat
18.	<i>Bromus tectorum</i>	downy brome
19.	<i>Capsella bursa-pastoris</i>	shepherd's-purse
20.	<i>Carduus nutans</i>	musk thistle
21.	<i>Cenchrus longispinus</i>	longspine sandbur
22.	<i>Chenopodium album</i>	common lambsquarters
23.	<i>Cirsium vulgare</i>	bull thistle
24.	<i>Conium maculatum</i>	poison-hemlock
25.	<i>Convolvulus arvensis</i>	field bindweed
26.	<i>Conyza canadensis</i>	horseweed
27.	<i>Cyperus esculentus</i>	yellow nutsedge
28.	<i>Datura stramonium</i>	jimsonweed
29.	<i>Descurainia sophia</i>	flixweed
30.	<i>Digitaria sanguinalis</i>	large crabgrass
31.	<i>Echinochloa crus-galli</i>	barnyardgrass
32.	<i>Elymus canadensis</i>	Canada wildrye
33.	<i>Elymus repens</i>	quackgrass
34.	<i>Equisetum arvense</i>	field horsetail
35.	<i>Eriochloa villosa</i>	woolly cupgrass
36.	<i>Galinsoga quadriradiata</i>	hairy galinsoga
37.	<i>Helianthus annuus</i>	common sunflower
38.	<i>Ipomoea hederacea</i>	ivyleaf morningglory
39.	<i>Ipomoea lacunosa</i>	pitted morningglory
40.	<i>Ipomoea purpurea</i>	tall morningglory
41.	<i>Kochia scoparia</i>	kochia
42.	<i>Lactuca serriola</i>	prickly lettuce
43.	<i>Lamium amplexicaule</i>	henbit
44.	<i>Malva neglecta</i>	common mallow

45.	<i>Oenothera albicaulis</i>	prairie evening-primrose
46.	<i>Panicum dichotomiflorum</i>	fall panicum
47.	<i>Phalaris arundinacea</i>	reed canarygrass
48.	<i>Phytolacca americana</i>	common pokeweed
49.	<i>Plantago lanceolata</i>	buckhorn plantain
50.	<i>Poa annua</i>	annual bluegrass
51.	<i>Polygonum aviculare</i>	prostrate knotweed
52.	<i>Polygonum convolvulus</i>	wild buckwheat
53.	<i>Polygonum cuspidatum</i>	Japanese knotweed
54.	<i>Polygonum pensylvanicum</i>	Pennsylvania smartweed
55.	<i>Portulaca oleracea</i>	common purslane
56.	<i>Proboscidea louisianica</i>	devil's-claw
57.	<i>Rumex crispus</i>	curly dock
58.	<i>Salsola tragus</i>	Russian-thistle
59.	<i>Setaria faberi</i>	giant foxtail
60.	<i>Setaria pumila</i>	yellow foxtail
61.	<i>Setaria verticillata</i>	bristly foxtail
62.	<i>Setaria viridis</i>	green foxtail
63.	<i>Sinapis arvensis</i>	wild mustard
64.	<i>Solanum nigrum</i>	black nightshade
65.	<i>Solanum ptychanthum</i>	eastern black nightshade
66.	<i>Solanum rostratum</i>	buffalobur
67.	<i>Sorghum bicolor</i>	shattercane
68.	<i>Sorghum halepense</i>	johnsongrass
69.	<i>Stellaria media</i>	common chickweed
70.	<i>Taraxacum officinale</i>	dandelion
71.	<i>Thlaspi arvense</i>	field pennycress
72.	<i>Tribulus terrestris</i>	puncturevine
73.	<i>Typha latifolia</i>	common cattail
74.	<i>Urochloa platyphylla</i>	broadleaf signalgrass
75.	<i>Xanthium strumarium</i>	common cocklebur

2016 NCWSS Collegiate Weed Contest Unknown Herbicide List

Common name	Trade name	Herbicide family (WSSA Herbicide Handbook)	Site of action	Timing	Rate (ai or ae/acre)	Adjuvant*
2,4-D	2,4-D	Phenoxy	TIR1 auxin receptor	POST	0.5 lb	None
atrazine	Aatrex	Triazine	Photosystem II inhibitor	PRE	1.5 lb	None
s-metolachlor	Dual II Magnum	Chloroacetamide	Long-chain fatty acid inhibitor	PRE	1.6 lb	None
bromoxynil	Buctril	Benzonitrile	Photosystem II inhibitor	POST	0.25 lb	None
carfentrazone-ethyl	Aim	Aryl triazinone	PPO inhibitor	POST	0.012 lb	COC, AMS
chlorimuron-ethyl	Classic	Sulfonylurea	ALS inhibitor	POST	0.008 lb	COC, AMS
clethodim	Select Max	Cyclohexanedione	ACCase inhibitor	POST	0.12 lb	COC, AMS
clopyralid	Stinger	Pyridinecarboxylic acid	TIR1 auxin receptor	POST	0.185 lb	None
dicamba	Clarity	Benzoic acid	TIR1 auxin receptor	POST	0.25 lb	None
diuron	Karmex	Phenylurea	Photosystem II inhibitor	PRE	0.8 lb	None
flumioxazin	Valor	N-phenylphthalimide	PPO inhibitor	PRE	0.096 lb	None
fomesafen	Flexstar	Diphenylether	PPO inhibitor	POST	0.25 lb	MSO, AMS
glufosinate	Liberty	Organophosphorous	Glutamine synthetase inhibitor	POST	0.53 lb	AMS
glyphosate	Roundup PowerMax	Organophosphorous	EPSPS inhibitor	POST	1.0 lb	AMS
halosulfuron	Permit	Sulfonylurea	ALS inhibitor	POST	0.031 lb	COC, AMS
imazethapyr	Pursuit	Imidazolinone	ALS inhibitor	POST	0.063 lb	COC, AMS
isoxaflutole	Balance Flexx	Isoxazole	HPPD inhibitor	PRE	0.078 lb	None
mesotrione	Callisto	Triketone	HPPD inhibitor	POST	0.094 lb	COC, AMS
metribuzin	Sencor	Triazinone	Photosystem II inhibitor	PRE	0.38 lb	None
nicosulfuron	Accent	Sulfonylurea	ALS inhibitor	POST	0.031 lb	COC, AMS
paraquat	Gramoxone	Bipyridilium	Photosystem I electron diverter	POST	0.5 lb	COC
pendimethalin	Prowl H2O	Dinitroaniline	Microtubule assembly inhibitor	PRE	0.95 lb	None
pyroxasulfone	Zidua	Pyrazole	Long-chain fatty acid inhibitor	PRE	0.16 lb	None
quinclorac	Paramount	Quinoline carboxylic acid	TIR1 auxin receptor	POST	0.38 lb	MSO, AMS
sulfentrazone	Spartan	Aryl triazinone	PPO inhibitor	PRE	0.31 lb	None
tembotrione	Laudis	Triketone	HPPD inhibitor	POST	0.082 lb	MSO, AMS

*NIS @ 0.25% v/v, COC @ 1% v/v, MSO @ 1% v/v, AMS @ 8.5 lb/100 gal

Potential Crop and Weed List for the Unknown Herbicide Event

Crops	Weeds
alfalfa	<i>Amaranthus</i> spp.
canola	barnyardgrass
corn	common cocklebur
cotton	common lambsquarters
grain sorghum	giant ragweed
pumpkins	<i>Ipomoea</i> spp.
snap beans	kochia
soybean	large crabgrass
sugarbeet	<i>Setaria</i> spp.
sunflower	shattercane
wheat	velvetleaf
	yellow nutsedge