



NCWSS Weed Contest

The purpose of the North Central Collegiate Weed Science Contest is to provide an educational experience from which students attending universities or colleges in the North Central region can broaden their applied skills in Weed Science. The contest provides an opportunity for Weed Science students to meet and talk with each other, be exposed to researchers from other universities and industry, and apply what they have learned using a contest to measure their capabilities.

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. 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) combination (graduates and undergraduates). A combination 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, up to three students may enter as individuals.

All students graduating with a B.S. degree six months before the contest (and not actively enrolled in a graduate program) will be able to participate as an undergraduate. Students will be able to participate five times as a graduate student in the North Central Collegiate Weed Science Contest.

Undergraduate and graduate students may win the individual award once per degree (once as undergraduate, once as MS, and once as PhD student), but then they are no longer eligible to compete in that degree classification. Once an undergraduate student wins the individual award, they may no longer compete as an undergraduate student but could compete as a graduate student. Once an undergraduate or graduate student wins the overall individual award in the graduate degree category, they will no longer be eligible to compete as a student unless they continue with an additional degree program. To maintain the participation involved with industry, past winners (who are still in their degree program) can serve in a volunteer role as a judge, grader, etc.

B. Awards

Plaques will be awarded for the following categories for a total of 22 awards:

Team – The team with the highest combined score from all events (Weed Identification, Written Test on Herbicide Application, Team Sprayer Calibration, Unknown Herbicide, and Problem Solving and Recommendation) will be the overall team winner, for both the graduate and undergraduate divisions. Second and third place teams will also be recognized (6 plaques). In addition, the graduate and undergraduate teams scoring highest in the team sprayer calibration event will receive a plaque (2 plaques).

Individual – The individual with the highest combined scores from the events Weed Identification, Written Test on Herbicide Application, Herbicide Identification, and Problem Solving and Recommendation will be the overall individual winner, for both the graduate and undergraduate divisions. Second and third place individuals will also be recognized (6 plaques). The highest individual scores by a graduate and an undergraduate student for each contest event (Weed Identification, Written Test on Herbicide Application, Herbicide Identification, and Problem Solving and Recommendation) will be recognized with a plaque (8 plaques).

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 events.

1. **Weed Identification (100 points).** The purpose of this event is for students to demonstrate their ability to identify weeds at all plant life stages and to use appropriate terminology for those species. The list of 75 species will be selected by the contest organizer from the most current “Composite List of Weeds,” published by Weed Science Society of America (www.wssa.net), unless specific exceptions are announced prior to the contest. Common names, Latin binomials, and spellings must conform to this list and will be sent to each participating university and posted on the NCWSS website at least 4 months prior to the contest. The organizer will select 30 of these species for the contest. Contest plants will be grown in either a field nursery or greenhouse and may be in any stage of growth or development, including seed samples.

Each student will identify 25 mature weeds, weed seedlings, or weed seeds for a total of 100 points. Students will be responsible for the correct Latin name (but not authority) and common name and spelling. Each sample is worth five points: two points for the common name and its correct spelling and three points for the Latin name, and its correct spelling, capitalization and underline. Contestants will identify five additional species to break any ties.

Common names, Latin names, and spellings must conform to the most current “Composite List of Weeds,” compiled by the Standardized Plant Names subcommittee of the WSSA, published by Weed Science Society of America (www.wssa.net), unless specific exceptions are announced prior to the contest.

Weed identification is scored as an individual event (100 points) and as a team event (composite score of top three individuals in case of four-member team or all individuals for a three-member team, up to 300 points for the team)

2. **Herbicide Application Technology.** This event consists of two sections: a Written Test and a Team Sprayer Calibration event.

A. **Written Test on Herbicide Application (50 points).** The purpose of this event is to assess the students' ability to do calculations that are related to herbicide application and related agronomic practices. Questions may be related to all aspects of herbicide application. Potential topics may include (but are not limited to) sprayer calibration, application volume, load ticket calculations, active ingredient calculations, adjuvant rate, area calculations, metric and English unit conversions, ability to use a pesticide label, nozzle nomenclature and selection, sprayer pressure, droplet size, drift reduction techniques, etc. The test will be comprised of multiple-choice calculation problems. A primary reference may be the TeeJet Agricultural Spray Products Catalog. Students will be provided with calculators and any other necessary reference materials. Personal calculators or other devices brought by the students are not permitted. A calculator will be provided at the event.

The Written Test may last from 30-60 minutes, per the discretion of the contest organizer. The Written Test must be reviewed by at least 3 members of the contest subcommittee at least one week prior to the contest to verify that it is reasonable in length and difficulty and to make recommended changes, if needed.

The Written Test portion is scored as an individual event worth 50 points per person and as a team event (composite score of top three individuals in case of four-member team or all individuals for a three-member team, up to 150 points for the team).

B. **Team Sprayer Calibration (200 points).** The purpose of this event is to evaluate a team's ability to calibrate and properly operate a research backpack sprayer. This is a team event and will not be used in calculating individual scores. However, students competing as individuals (less than 3 members per team) may also compete in this event.

All safety equipment, sprayer components, calculators, stopwatches and TeeJet Agricultural Spray Products catalogs will be provided by the society and/or contest host. Use of personal calculators will not be permitted. Safety glasses must be worn by all students, judges, observers, etc., who are in the calibration event area. 50 points will be deducted from team score if a judge sees a student without safety glasses during the time they are working on the problem.

Each team will be given a basic (easily solved) written problem that will be calculated during this session. The answers to the question will provide the parameters (application volume, recommended droplet size, etc.) to which a CO₂ backpack sprayer is to be calibrated. Each team will be expected to choose the appropriate nozzle tips, speed, and pressure for accurate calibration and application. Each team will be asked to deliver a designated number of gallons/acre or liters/hectare over a given length or area demonstrating proper sprayer use.

Scoring will be based on accuracy of calibration and application. Time will be used to break any ties. Time will start when the team approaches the spray table. When a team is ready to make the calibration run, they are to advise the judge and the time will be stopped. If time reaches 25 minutes the judge will instruct the contestants to stop. Once time is stopped, no further adjustments can be made to the sprayer. The calibrated sprayer is then used by a contestant to spray a predetermined area with the judge watching for proper boom height, speed and uniformity of spray pattern. Following the application evaluation, each nozzle will be checked for accurate output. Variation in output up to $\pm 4\%$ variation per nozzle will be allowed. As an example, if the correct nozzle output is 150 ml/15 sec, the acceptable range will be 144 to 156 mL/15 sec.

Scoring is as follows:

- Correct problem calculation (35 points)
- Correct boom height (15 points)
- Correct speed (15 points)
- Uniform spray pattern (15 points)
- Nozzle selection (40 points, 10 points/nozzle)
- Screen selection (20 points, 5 points/screen)

Sprayer output (60 points, 15 points per nozzle. Each 1% over or under the 4% allowance will result in a loss of 1 point. For example, if a nozzle is producing 8% less than the correct calculated output, 4 points will be deducted.)

Total = 200 points

The basic written problem must be reviewed by at least 3 members of the contest subcommittee at least one week prior to the contest to verify it is reasonable in difficulty and length, and to make recommendations for changes, if necessary. There should also be a thorough evaluation of all equipment prior to the contest to insure it is working properly.

3. Herbicide Identification.

The purpose of this event is for students to demonstrate their ability to identify herbicide site of action and active ingredient based on symptomology seen on treated plants and selectivity among different species. The contest organizer will select 30 herbicide active ingredients (a.i.) from the WSSA-Herbicide Site of Action Classification List (<http://wssa.net/wssa/weed/herbicides/>). Herbicide name, chemical family, WSSA/HRAC code (Group number), and site of action must conform to this list. The herbicide identification list will be posted on the NCWSS website and separated lists of families, site of action, and common name will be provided to competitors. It will include the a.i., the chemical family, the WSSA site of action name and WSSA/HRAC code (group number), and the herbicide trade name. In addition, the application timing, the herbicide rate, adjuvants to be used (where applicable) and a list of crops and weeds that may be planted in the herbicide screen will be provided.

The contest will have 15 herbicide plots with a minimum of 10 plant species. Crop and weed species will be planted and treated with herbicides as outlined above. Each plant row will be identified to species, and herbicide-tolerant traits, if any, will be indicated. Each contestant will identify the herbicide applied to ten plots and each plot will be worth 10 points. Five additional plots will be identified to break any ties. There can be a control plot in the contest, which must be identified as a control. A herbicide may be used more than once in the event plots.

Students competing on graduate student teams will receive 5 points for the correct common name, 3 points for the correct herbicide family, 1 point for the correct site of action, and 1 point for group number. Students competing on undergraduate student teams will receive 5 points for the correct site of action and 5 points for group number. Students competing as undergraduate individuals on graduate teams will be scored like graduate students for the team score, and as undergraduate students for the individual competition. For undergraduate students, correct common name will be used only as a tiebreaker.

Herbicide active ingredients, chemical family, mechanism of action and group number must conform to the most current "Herbicide Handbook", published by Weed Science Society of America, unless specific exceptions are announced prior to the contest.

Herbicide Identification is scored as an individual event worth 100 points per person and as a team event (composite score of top three individuals in case of four-member team and all team or individuals for a three-member team, up to 300 points for the team).

4. Problem Solving and Recommendation.

The purpose of this event is for students to demonstrate their ability to troubleshoot a plant production problem in a field (agronomic, horticulture, turf) or non-crop situation and recommend an effective solution to that problem. Recommendations must comply with accepted practices. Students should consider all factors which influence plant growth and development when making their evaluation. 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 client. Any commodity (corn, soybean, wheat, vegetable, turf, etc.) or scenario (such as herbicide injury, weed resistance, agronomic errors, etc.) is eligible to be the focus of the Problem Solving and Recommendation event. Students should be provided with sufficient background information to accurately simulate a field call where the extension, sales, or research person would have similar resources available.

Each student will handle only one situation. Students will be selected randomly for each possible situation. Ideally, each team member will evaluate a different situation. Scores will be normalized within a situation. The top performer within each situation will participate in a common scenario (not used in the preliminary round) to determine the overall winner.

Students will be evaluated by the role-playing farmer and situation judge based on the following criteria:

25 points – How the student approached the farmer.

45 points – Assessment of situation; determine the problem.

15 points – Recommendation for the current year

15 points – Recommendation for next year (or future years)

Problem Solving and Recommendation is scored as an individual event worth 100 points per person and as a team event (composite score of top three individuals in case of four-member team and all team or individuals for a three-member team, up to 300 points for the team).

D. Advisory Panel

An advisory panel will be responsible for scoring the contest. The panel will be the final authority concerning all questions regarding scores. Individuals from the host location will be the authority for all questions relating to the field portion of the contest.

E. Location

The North Central Collegiate Weed Science Contest will be held at any facility with the capability of providing all the designated events. The Resident Education and Industry Committees shall jointly work to identify and secure future contest host locations. Any location must be within the North Central Weed Science Society territory. With NCWSS board approval, the Resident Education Committee can choose to hold the contest in conjunction with other regional societies at a location outside of the NCWSS territory.

Additions or changes to the North Central Collegiate Weed Science Contest may be accomplished by a majority vote of the NCWSS Board of Directors. The contest committee has the authority to make minor changes, subject to approval of the President of the Society. Any other school outside the NCWSS society that wants to participate in the contest will need prior approval from the Resident Education Committee and the host.

2024 NCWSS Student Weed Contest – Weed Identification List

	common name	latin name	family
1	Palmer amaranth	<i>Amaranthus palmeri</i>	Amaranthaceae
2	redroot pigweed	<i>Amaranthus retroflexus</i>	Amaranthaceae
3	waterhemp	<i>Amaranthus tuberculatus</i>	Amaranthaceae
4	poison hemlock	<i>Conium maculatum</i>	Apiaceae
5	wild carrot	<i>Daucus carota</i>	Apiaceae
6	wild parsnip	<i>Pastinaca sativa</i>	Apiaceae
7	hemp dogbane	<i>Apocynum cannabinum</i>	Apocynaceae
8	common milkweed	<i>Asclepias syriaca</i>	Apocynaceae
9	common duckweed	<i>Lemna minor</i>	Araceae
10	common ragweed	<i>Ambrosia artemisiifolia</i>	Asteraceae
11	giant ragweed	<i>Ambrosia trifida</i>	Asteraceae
12	common burdock	<i>Arctium minus</i>	Asteraceae
13	devils beggarticks	<i>Bidens frondosa</i>	Asteraceae
14	musk thistle	<i>Carduus nutans</i>	Asteraceae
15	chicory	<i>Cichorium intybus</i>	Asteraceae
16	Canada thistle	<i>Cirsium arvense</i>	Asteraceae
17	bull thistle	<i>Cirsium vulgare</i>	Asteraceae
18	horseweed	<i>Erigeron canadensis</i>	Asteraceae
19	common sunflower	<i>Helianthus annuus</i>	Asteraceae
20	dandelion	<i>Taraxacum officinale</i>	Asteraceae
21	prairie ironweed	<i>Vernonia fasciculata</i>	Asteraceae
22	common cocklebur	<i>Xanthium strumarium</i>	Asteraceae
23	shepherds purse	<i>Capsella bursa-pastoris</i>	Brassicaceae
24	Virginia pepperweed	<i>Lepidium virginicum</i>	Brassicaceae
25	field pennycress	<i>Thlaspi arvense</i>	Brassicaceae
26	Japanese honeysuckle	<i>Lonicera jampanica</i>	Caprifoliaceae
27	common chickweed	<i>Stellaria media</i>	Caryophyllaceae
28	kochia	<i>Bassia scoparia</i>	Chenopodiaceae
29	common lambsquarters	<i>Chenopodium album</i>	Chenopodiaceae
30	Russian thistle	<i>Salsola tagus</i>	Chenopodiaceae
31	field bindweed	<i>Convolvulus arvensis</i>	Convolvulaceae
32	ivyleaf morningglory	<i>Ipomoea hederacea</i>	Convolvulaceae
33	burcucumber	<i>Sicyos angulatus</i>	Cucurbitaceae
34	yellow nutsedge	<i>Cyperus esculentus</i>	Cyperaceae
35	common teasel	<i>Dipsacus fullonum</i>	Dipsacaaceae
36	cutleaf teasel	<i>Dipsacus laciniatus</i>	Dipsacaaceae
37	leafy spurge	<i>Euphorbia esula</i>	Euphorbiaceae
38	sericea lespedeza	<i>Lespedeza cuneata</i>	Fabaceae
39	hemp sesbania	<i>Sesbania herbacea</i>	Fabaceae
40	ground ivy	<i>Glechoma hederacea</i>	Lamiaceae
41	henbit	<i>Lamium amplexicaule</i>	Lamiaceae

42	purple deadnettle	<i>Lamium purpureum</i>	Lamiaceae
43	purple loosestrife	<i>Lythrum salicaria</i>	Lythraceae
44	velvetleaf	<i>Abutilon theophrasti</i>	Malvaceae
45	little mallow	<i>Malva parviflora</i>	Malvaceae
46	prickly sida	<i>Sida spinosa</i>	Malvaceae
47	carpetweed	<i>Mollugo verticillata</i>	Molluginaceae
48	common pokeweed	<i>Phytolacca americana</i>	Phytolaccaceae
49	buckhorn plantain	<i>Plantago lanceolata</i>	Plantaginaceae
50	downy brome	<i>Bromus tectorum</i>	Poaceae
51	bermudagrass	<i>Cynodon dactylon</i>	Poaceae
52	large crabgrass	<i>Digitaria sanguinalis</i>	Poaceae
53	barnyardgrass	<i>Echinochloa crus-galli</i>	Poaceae
54	goosegrass	<i>Eleusine indica</i>	Poaceae
55	quackgrass	<i>Elymus repens</i>	Poaceae
56	nimblewill	<i>Muhlenbergia schreberi</i>	Poaceae
57	fall panicum	<i>Panicum dichotomiflorum</i>	Poaceae
58	giant foxtail	<i>Setaria faberi</i>	Poaceae
59	yellow foxtail	<i>Setaria pumila</i>	Poaceae
60	green foxtail	<i>Setaria viridis</i>	Poaceae
61	shattercane	<i>Sorghum bicolor</i>	Poaceae
62	johnsongrass	<i>Sorghum halepense</i>	Poaceae
63	wild buckwheat	<i>Fallopia convolvulus</i>	Polygonaceae
64	Pennsylvania smartweed	<i>Persicaria pensylvanica</i>	Polygonaceae
65	prostrate knotweed	<i>Polygonum aviculare</i>	Polygonaceae
66	curly dock	<i>Rumex crispus</i>	Polygonaceae
67	common purslane	<i>Portulaca oleracea</i>	Portulacaceae
68	common mullein	<i>Verbascum thapsus</i>	Scrophulariaceae
69	jimsonweed	<i>Datura stramonium</i>	Solanaceae
70	horsenettle	<i>Solanum carolinense</i>	Solanaceae
71	eastern black nightshade	<i>Solanum ptychanthum</i>	Solanaceae
72	buffalobur	<i>Solanum rostratum</i>	Solanaceae
73	common cattail	<i>Typha latifolia</i>	Typhaceae
74	common blue violet	<i>Viola sororia</i>	Violaceae
75	puncturevine	<i>Tribulus terrestris</i>	Zygophyllaceae

2024 NCWSS Student Weed Contest - Crop and Weed List for the Unknown Herbicide Event

Crops

alfalfa
canola
cereal rye
cotton
field corn
field pea
grain sorghum
oat
pearl millet
popcorn
pumpkin
soybean
sunflower
tillage radish
tomato
wheat (spring)

Weeds

Amaranth spp.
barnyardgrass
common cocklebur
common lambsquarters
common purslane
downy brome
fall panicum
giant ragweed
green foxtail
hemp sesbania
Ipomea spp.
large crabgrass
horseweed
shattercane
velvetleaf
yellow nutsedge

2024 NCWSS Student Weed Contest Unknown Herbicide List

	Common Name	Trade Name	Group Num-ber	Site of Action	Herbicide Family	Application Timing	Rate (per Acre)	Adju- vant*
1	2,4-D	Enlist One	4	Auxin Mimics	Phenoxy-carboxylates	POST	2 pts	COC
2	Acetochlor	Warrant	15	Inhibition of Very Long-Chain Fatty Acid Synthesis	α -Chloroacetamides	PRE	1.5 qts	None
3	Atrazine	Aatrex	5	Inhibition of Photosynthesis at PSII - Serine 264 Binders	Triazines	PRE	4 pts	COC, AMS
4	Bentazon	Basagran	6	Inhibition of Photosynthesis at PSII - Histidine 215 Binders	Benzothiadiazinone	POST	2 pts	COC, AMS
5	Clethodim	Select 2EC	1	Inhibition of Acetyl CoA Carboxylase	Cyclohexanediones	POST	1 pt	NIS
6	Clomazone	Command 3 ME	13	Inhibition of Deoxy-D-Xyulose Phosphate Synthase	Isoxazolidinone	PRE	1 qt	None
7	Clopyralid	Stigmata	4	Auxin Mimics	Pyridine-carboxylates	POST	4 oz	None
8	Dicamba	Xtendimax with VaporGrip Technology	4	Auxin Mimics	Benzoates	POST	22 oz	None
9	Flumioxazin	Valor EZ	14	Inhibition of Protoporphyrinogen Oxidase	N-Phenyl-imides	PRE	2 oz	None
10	Fluthiacet-methyl	Cadet	14	Inhibition of Protoporphyrinogen Oxidase	N-Phenyl-imides	POST	0.6 oz	None
11	Fomesafen	Flexstar	14	Inhibition of Protoporphyrinogen Oxidase	Diphenyl ethers	POST	1 pt	COC, AMS
12	Glufosinate-ammonium	Liberty	10	Inhibition of Glutamine Synthetase	Phosphinic acids	POST	22 oz	None
13	Glyphosate	Roundup PowerMAX 3	9	Inhibition of Enolpyruvyl Shikimate Phosphate Synthase	Glycine	POST	20 oz	None
14	Imazaquin	Scepter 70 DG	2	Inhibition of Acetolactate Synthase	Imidazolinones	PRE	2.1 oz	None
15	Imazethapyr	Pursuit	2	Inhibition of Acetolactate Synthase	Imidazolinones	PRE	4 oz	None
16	Isoxaflutole	Balance Pro	27	Inhibition of Hydroxyphenyl Pyruvate Dioxygenase	Isoxazoles	PRE	2.25 oz	COC, AMS
17	Lactofen	Cobra	14	Inhibition of Protoporphyrinogen Oxidase	Diphenyl ethers	POST	12.5 oz	NIS
18	Mesotrione	Callisto	27	Inhibition of Hydroxyphenyl Pyruvate Dioxygenase	Triketones	PRE	3 oz	None

19	Metribuzin	Metribuzin 75 DF	5	Inhibition of Photosynthesis at PSII - Serine 264 Binders	Triazinones	PRE	10.6 oz	None
20	Nicosulfuron	Accent Q	2	Inhibition of Acetolactate Synthase	Sulfonylureas	POST	0.9 oz	None
21	Paraquat	Gramoxone SL 3.0	22	PS I Electron Diversion	Pyridiniums	POST	2.0 pts	MSO, AMS
22	Pendimethalin	Prowl H2O	3	Inhibition of Microtubule Assembly	Dinitroanilines	PRE	3.0 pts	NIS
23	Pyroxasulfone	Zidua	15	Inhibition of Very Long-Chain Fatty Acid Synthesis	Isoxazolines	PRE	2.0 oz	None
24	Quizalofop-ethyl	Assure II	1	Inhibition of Acetyl CoA Carboxylase	Aryloxyphenoxy-propionates	POST	7 oz	AMS
25	Saflufenacil	Sharpen	14	Inhibition of Protoporphyrinogen Oxidase	N-Phenyl-imides	PRE	2.5 oz	None
26	Sethoxydim	Poast Plus	1	Inhibition of Acetyl CoA Carboxylase	Cyclohexanediones	POST	1.5 pts	AMS
27	S-metolachlor	Dual II Magnum	15	Inhibition of Very Long-Chain Fatty Acid Synthesis	α -Chloroacetamides	PRE	1.33 pts	MSO, AMS
28	Sulfentrazone	Spartan 4F	14	Inhibition of Protoporphyrinogen Oxidase	N-Phenyl-triazolinones	PRE	8 oz	COC, AMS
29	Tembotrione	Laudis	27	Inhibition of Hydroxyphenyl Pyruvate Dioxygenase	Triketones	POST	3 oz	None
30	Topramezone	Impact	27	Inhibition of Hydroxyphenyl Pyruvate Dioxygenase	Pyrazoles	POST	1 oz	COC, AMS

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