



2022 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. 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 overall 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 overall individual award, they may no longer compete as an undergraduate student but could compete as a graduate student. Once an

undergraduate or a 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:

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

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 NCWSS Master Weed List maintained by the Resident Education Committee. This weed identification list will be sent to each participating university, and posted on the NCWSS website, with the correct spelling of each species, at least 4 months prior to the contest. The organizer will select 30 of these species for the contest. Each student will identify weeds using either seeds, seedlings, mature plants or reproductive structures with distinguishing characteristics (e.g. rhizomes, fruits, inflorescences) for a total of 100 points.

Students will be responsible for the correct Latin binomial (but NOT authority) and common name and spelling. Each sample is worth four points: two points for the common name and its correct spelling and two points for the Latin binomial, and its correct spelling. Contestants will identify five additional species to break any ties.

Common names, Latin binomials, 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 may be comprised of multiple choice, short answer, and written 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 (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. All spray equipment will be provided by the society and/or contest host. 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. 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. The problem set should be sent to "Summer Contest Rules Subcommittee" chair. The chair will then send it to three subcommittee members for further review and approval. There should also be a thorough evaluation of all equipment prior to the contest to insure it is working properly.

3) IDENTIFICATION OF UNKNOWN HERBICIDES

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 NCWSS Master Herbicide List maintained by the Resident Education Committee. The herbicide identification list will be sent to each participating university and posted on the NCWSS website. It will include the a.i., the chemical family, the WSSA site of action, 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 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 an untreated plot in the contest, which must be identified as untreated. Each plant row will be identified to species, and herbicides-tolerant traits, if any, will be indicated. 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, and 2 points for the correct site of action and/or group number. Students competing on undergraduate student teams will receive 10 points for the correct site of action. 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. Misspelling of the common names, herbicide family, and site of action will result in loss of all points for that answer.

Herbicide active ingredients, chemical family, site of action must conform to the WSSA-Herbicide Site of Action Classification List (<http://wssa.net/wssa/weed/herbicides/>). Herbicide Identification is scored as an individual event worth 100 points per person and **as a team event (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 (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 together to identify and secure future contest host locations. Any location must be within the North Central Weed Science Society territory.

ADDITIONS OR CHANGES

Additions or changes to the North Central Collegiate Weed Science Contest may be accomplished by a majority vote of the Board of Directors at any annual meeting. 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.

2022 NCWSS Student Contest – Weed Identification

	common name	latin name	family
1	redroot pigweed	<i>Amaranthus retroflexus</i>	Amaranthaceae
2	waterhemp	<i>Amaranthus tuberculatus</i>	Amaranthaceae
3	Palmer amaranth	<i>Amaranthus palmeri</i>	Amaranthaceae
4	wild carrot	<i>Daucus carota</i>	Apiaceae
5	wild parsnip	<i>Pastinaca sativa</i>	Apiaceae
6	poison-hemlock	<i>Conium maculatum</i>	Apiaceae
7	hemp dogbane	<i>Apocynum cannabinum</i>	Apocynaceae
8	honeysuckle swallowwort	<i>Cynanchum laeve</i>	Apocynaceae
9	common milkweed	<i>Asclepias syriaca</i>	Asclepidaceae
10	devils beggarticks	<i>Bidens frondosa</i>	Asteraceae
11	common ragweed	<i>Ambrosia artemisiifolia</i>	Asteraceae
12	giant ragweed	<i>Ambrosia trifida</i>	Asteraceae
13	common burdock	<i>Arctium minus</i>	Asteraceae
14	musk thistle	<i>Carduus nutans</i>	Asteraceae
15	bull thistle	<i>Cirsium vulgare</i>	Asteraceae
16	Canada thistle	<i>Cirsium arvense</i>	Asteraceae
17	horseweed	<i>Erigeron canadensis</i>	Asteraceae
18	prickly lettuce	<i>Lactuca serriola</i>	Asteraceae
19	dandelion	<i>Taraxacum officinale</i>	Asteraceae
20	common cocklebur	<i>Xanthium strumarium</i>	Asteraceae
21	hairy galinsoga	<i>Galinsoga quadriradiata</i>	Asteraceae
22	common sunflower	<i>Helianthus annuus</i>	Asteraceae
23	jewelweed	<i>Impatiens capensis</i>	Balsaminaceae
24	shepherd's-purse	<i>Capsella bursa-pastoris</i>	Brassicaceae
25	field pennycress	<i>Thlaspi arvense</i>	Brassicaceae
26	garlic mustard	<i>Alliaria petiolata</i>	Brassicaceae
27	white campion	<i>Silene latifolia</i>	Caryophyllaceae
28	common chickweed	<i>Stellaria media</i>	Caryophyllaceae
29	common lambsquarters	<i>Chenopodium album</i>	Chenopodiaceae
30	kochia	<i>Bassia scoparia</i>	Chenopodiaceae
31	Russian-thistle	<i>Salsola tragus</i>	Chenopodiaceae

32	Asiatic dayflower	<i>Commelina communis</i>	Commelinaceae
33	field bindweed	<i>Convolvulus arvensis</i>	Convolvulaceae
34	hedge bindweed	<i>Calystegia sepium</i>	Convolvulaceae
35	ivyleaf morningglory	<i>Ipomoea hederacea</i>	Convolvulaceae
36	burcucumber	<i>Sicyos angulatus</i>	Cucurbitaceae
37	yellow nutsedge	<i>Cyperus esculentus</i>	Cyperaceae
38	leafy spurge	<i>Euphorbia esula</i>	Euphorbiaceae
39	spotted spurge	<i>Euphorbia maculata</i>	Euphorbiaceae
40	trailing crownvetch	<i>Securigera varia</i>	Fabaceae
41	sericea lespedeza	<i>Lespedeza cuneata</i>	Fabaceae
42	ground ivy	<i>Glechoma hederacea</i>	Lamiaceae
43	henbit	<i>Lamium amplexicaule</i>	Lamiaceae
44	velvetleaf	<i>Abutilon theophrasti</i>	Malvaceae
45	Venice mallow	<i>Hibiscus trionum</i>	Malvaceae
46	common mallow	<i>Malva neglecta</i>	Malvaceae
47	prickly sida	<i>Sida spinosa</i>	Malvaceae
48	carpetweed	<i>Mollugo verticillata</i>	Molluginaceae
49	buckhorn plantain	<i>Plantago lanceolata</i>	Plantaginaceae
50	Amur silvergrass	<i>Miscanthus sacchariflorus</i>	Poaceae
51	tumble windmillgrass	<i>Chloris verticillata</i>	Poaceae
52	giant foxtail	<i>Setaria faberi</i>	Poaceae
53	yellow foxtail	<i>Setaria pumila</i>	Poaceae
54	green foxtail	<i>Setaria viridis</i>	Poaceae
55	woolly cupgrass	<i>Eriochloa villosa</i>	Poaceae
56	witchgrass	<i>Panicum capillare</i>	Poaceae
57	fall panicum	<i>Panicum dichotomiflorum</i>	Poaceae
58	barnyardgrass	<i>Echinochloa crus galli</i>	Poaceae
59	downy brome	<i>Bromus tectorum</i>	Poaceae
60	large crabgrass	<i>Digitaria sanguinalis</i>	Poaceae
61	goosegrass	<i>Eleusine indica</i>	Poaceae
62	quackgrass	<i>Elymus repens</i>	Poaceae
63	foxtail barley	<i>Hordeum jubatum</i>	Poaceae
64	nimblewill	<i>Muhlenbergia schreberi</i>	Poaceae
65	shattercane	<i>Sorghum bicolor</i>	Poaceae

66	johnsongrass	Sorghum halepense	Poaceae
67	prostrate knotweed	Polygonum aviculare	Polygonaceae
68	wild buckwheat	Fallopia convolvulus	Polygonaceae
69	Pennsylvania smartweed	Persicaria pensylvanica	Polygonaceae
70	catchweed bedstraw	Galium aparine	Rubiaceae
71	jimsonweed	Datura stramonium	Solanaceae
72	horsenettle	Solanum carolinense	Solanaceae
73	eastern black nightshade	Solanum ptychanthum	Solanaceae
74	buffalobur	Solanum rostratum	Solanaceae
75	prostrate vervain	Verbena bracteata	Verbenaceae

2022 NCWSS Collegiate Weed Contest Unknown Herbicide List

	Common name	Trade name	Herbicide family (WSSA SOA List)	Site of action	Group Number	Timing	Rate (ai or ae/acre)	Adjuvant*
1	clethodim	Select Max	Cyclohexanedione	ACCCase inhibitor	1	POST	0.091 lb	COC, AMS
2	quizalofop-ethyl	Assure II	Aryloxyphenoxy-propionate	ACCCase inhibitor	1	POST	0.062 lb	COC, AMS
3	halosulfuron-methyl	Permit	Sulfonylurea	ALS inhibitor	2	POST	0.031 lb	COC, AMS
4	imazethapyr	Pursuit	Imidazolinone	ALS inhibitor	2	POST	0.047 lb	COC, AMS
5	nicosulfuron	Accent Q	Sulfonylurea	ALS inhibitor	2	POST	0.031 lb	COC, AMS
6	glyphosate	Roundup PowerMax	Glycine	EPSPS inhibitor	9	POST	1.125 lb	AMS
7	glufosinate	Liberty 280 SL	Phosphinic acid	Glutamine synthetase inhibitor	10	POST	0.6 lb	AMS
8	mesotrione	Callisto	Triketone	HPPD inhibitor	27	POST	0.094 lb	COC, AMS
9	tembotrione	Laudis	Triketone	HPPD inhibitor	27	POST	0.082 lb	MSO, AMS
10	pendimethalin	Prowl H2O	Dinitroaniline	Microtubule assembly inhibitor	3	PRE	0.95 lb	None
11	acetochlor	Surpass NXT	α -Chloroacetamide	Very Long Chain Fatty Acid Inhibitor	15	PRE	1.5 lb	None
12	pyroxasulfone	Zidua SC	Isoxazoline	Very Long Chain Fatty Acid Inhibitor	15	PRE	0.16 lb	None
13	paraquat	Gramoxone 3 SL	Pyridinium	Photosystem I electron diverter	22	POST	0.5 lb	NIS
14	atrazine	Aatrex 4L	Triazine	Photosystem II inhibitor	5	PRE	1 lb	None
15	bentazon	Basagran	Benzothiadiazinone	Photosystem II inhibitor	6	POST	0.5 lb	COC, AMS
16	isoxaben	Gallery SC	Benzamide	Cellulose synthesis inhibitor	29	PRE	0.75 lb	None
17	metribuzin	Tricor 75DF	Triazinone	Photosystem II inhibitor	5	PRE	0.38 lb	None
18	carfentrazone-ethyl	Aim EC	N-Phenyl-triazolinone	PPO inhibitor	14	POST	0.012 lb	COC, AMS
19	flumioxazin	Valor EZ	N-Phenyl-imide	PPO inhibitor	14	PRE	0.094 lb	None
20	fomesafen	Reflex	Diphenyl ether	PPO inhibitor	14	POST	0.25 lb	COC, AMS
21	lactofen	Cobra	Diphenyl ether	PPO inhibitor	14	POST	0.195 lb	COC, AMS
22	saflufenacil	Sharpen	N-Phenyl-imide	PPO inhibitor	14	PRE	0.045 lb	None
23	sulfentrazone	Spartan 4F	N-Phenyl-triazolinone	PPO inhibitor	14	PRE	0.188 lb	None
24	2,4-D	Enlist One	Phenoxy-carboxylate	Auxin mimics	4	POST	0.95 lb	COC
25	clopyralid	Stinger	Pyridine carboxylate	Auxin mimics	4	POST	0.094 lb	COC
26	dicamba	Xtendimax with VaporGrip Technology	Benzoate	Auxin mimics	4	POST	0.5 lb	COC
27	dimethenamid	Outlook	α -Chloroacetamide	Very Long Chain Fatty Acid Inhibitor	15	PRE	0.845 lb	None
28	isoxaflutole	Balance Flexx	Isoxazole	HPPD inhibitor	27	PRE	0.094 lb	None
29	topramezone	Armezon	Pyrazole	HPPD inhibitor	27	POST	0.022 lb	COC, AMS
30	cloransulam-methyl	FirstRate	Triazolopyrimidine - Type 1	ALS inhibitor	2	POST	0.016 lb	COC, AMS

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

Crop and Weed List for the Unknown Herbicide Event

Crop

Field corn
Grain sorghum
Oats
Soybeans
Sunflower
Canola
Alfalfa
Table beet

Weeds

Yellow nutsedge
Giant foxtail
Yellow foxtail
Barnyardgrass
Large crabgrass
Velvetleaf
Ivyleaf morningglory
Common or giant ragweed
Common cocklebur
Common lambsquarters
Redroot pigweed
Kochia