



## 2021 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 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 in the MS degree

category. However, 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. Once an undergraduate or an MS graduate student wins the individual award in the MS degree category, they will no longer be eligible to compete as a graduate student until actively enrolled in a PhD program.

## 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 (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 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. 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 binomial 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](http://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.

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. This is a team event and will not be used in calculating individual scores. However, students competing as individuals (less than 4 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 CO<sub>2</sub> 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 mechanism 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 mechanism of action (mode of action) name and 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 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, and 2 points for the correct mechanism of action and/or group number. Students competing on undergraduate student teams will receive 10 points for the correct mechanism 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 mechanism of action will result in loss of all points for that answer.

Herbicide active ingredients, chemical family, mechanism 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 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 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.

### 2021 NCWSS Student Contest – Weed Identification

	<b>Latin binomial</b>	<b>Common name</b>	<b>Family</b>	
1	<i>Amaranthus albus</i>	tumble pigweed	Amaranthaceae	Pigweed family
2	<i>Amaranthus blitoides</i>	prostrate pigweed	Amaranthaceae	Pigweed family
3	<i>Amaranthus palmeri</i>	Palmer amaranth	Amaranthaceae	Pigweed family
4	<i>Amaranthus powellii</i>	Powell amaranth	Amaranthaceae	Pigweed family
5	<i>Amaranthus retroflexus</i>	redroot pigweed	Amaranthaceae	Pigweed family
6	<i>Amaranthus tuberculatus</i>	waterhemp	Amaranthaceae	Pigweed family
7	<i>Conium maculatum</i>	poison-hemlock	Apiaceae	Parsley family
8	<i>Apocynum cannabinum</i>	hemp dogbane	Apocynaceae	Dogbane family
9	<i>Ampelamus albidus</i>	honeysuckle milkweed	Asclepiadaceae	Milkweed family
10	<i>Asclepias syriaca</i>	common milkweed	Asclepiadaceae	Milkweed family
11	<i>Ambrosia artemisiifolia</i>	common ragweed	Asteraceae	Sunflower family
12	<i>Ambrosia trifida</i>	giant ragweed	Asteraceae	Sunflower family
13	<i>Arctium minus</i>	common burdock	Asteraceae	Sunflower family
14	<i>Artemisia biennis</i>	biennial wormwood	Asteraceae	Sunflower family
15	<i>Carduus nutans</i>	musk thistle	Asteraceae	Sunflower family
16	<i>Cirsium arvense</i>	Canada thistle	Asteraceae	Sunflower family
17	<i>Cirsium vulgare</i>	bull thistle	Asteraceae	Sunflower family
18	<i>Crepis tectorum</i>	narrowleaf hawksbeard	Asteraceae	Sunflower family
19	<i>Cyclachaena xanthiifolia</i>	marshelder	Asteraceae	Sunflower family
20	<i>Erigeron canadensis</i>	horseweed	Asteraceae	Sunflower family
21	<i>Helianthus annuus</i>	common sunflower	Asteraceae	Sunflower family
22	<i>Lactuca serriola</i>	prickly lettuce	Asteraceae	Sunflower family
23	<i>Taraxacum officinale</i>	dandelion	Asteraceae	Sunflower family
24	<i>Xanthium strumarium</i>	common cocklebur	Asteraceae	Sunflower family
25	<i>Verbascum thapsus</i>	common mullein	Scrophulariaceae	Figwort family
26	<i>Capsella bursa-pastoris</i>	shepherd's purse	Brassicaceae	Mustard family
27	<i>Descurainia sophia</i>	flixweed	Brassicaceae	Mustard family
28	<i>Sinapis arvensis</i>	wild mustard	Brassicaceae	Mustard family
29	<i>Thlaspi arvense</i>	field pennycress	Brassicaceae	Mustard family
30	<i>Stellaria media</i>	common chickweed	Caryophyllaceae	Pink family
31	<i>Bassia scoparia</i>	kochia	Chenopodiaceae	Goosefoot family
32	<i>Chenopodium album</i>	common lambsquarters	Chenopodiaceae	Goosefoot family
33	<i>Salsola tragus</i>	Russian-thistle	Chenopodiaceae	Goosefoot family
34	<i>Calystegia sepium</i>	hedge bindweed	Convolvulaceae	Morningglory family
35	<i>Convolvulus arvensis</i>	field bindweed	Convolvulaceae	Morningglory family
36	<i>Ipomoea hederacea</i>	ivyleaf morningglory	Convolvulaceae	Morningglory family
37	<i>Ipomoea lacunosa</i>	pitted morningglory	Convolvulaceae	Morningglory family
38	<i>Ipomoea purpurea</i>	tall morningglory	Convolvulaceae	Morningglory family
39	<i>Sicyos angulatus</i>	burcucumber	Cucurbitaceae	Gourd family

	<b>Latin binomial</b>	<b>Common name</b>	<b>Family</b>	
40	<i>Cyperus esculentus</i>	yellow nutsedge	Cyperaceae	Sedge family
41	<i>Tribulus terrestris</i>	puncturevine	Zygophyllaceae	Caltrop family
42	<i>Equisetum arvense</i>	field horsetail	Equisetaceae	Horsetail family
43	<i>Euphorbia esula</i>	leafy spurge	Euphorbiaceae	Spurge family
44	<i>Medicago lupulina</i>	black medic	Fabaceae	Bean family
45	<i>Glechoma hederacea</i>	ground ivy	Lamiaceae	Mint family
46	<i>Lamium amplexicaule</i>	henbit	Lamiaceae	Mint family
47	<i>Salvia reflexa</i>	lanceleaf sage	Lamiaceae	Mint family
48	<i>Portulaca oleracea</i>	common purslane	Portulacaceae	Purslane family
49	<i>Abutilon theophrasti</i>	velvetleaf	Malvaceae	Mallow family
50	<i>Hibiscus trionum</i>	Venice mallow	Malvaceae	Mallow family
51	<i>Malva neglecta</i>	common mallow	Malvaceae	Mallow family
52	<i>Plantago major</i>	broadleaf plantain	Plantaginaceae	Plantain family
53	<i>Avena fatua</i>	wild oat	Poaceae	Grass family
54	<i>Aegilops cylindrica</i>	jointed goatgrass	Poaceae	Grass family
55	<i>Bromus tectorum</i>	downy brome	Poaceae	Grass family
56	<i>Cenchrus longispinus</i>	longspine sandbur	Poaceae	Grass family
57	<i>Digitaria sanguinalis</i>	large crabgrass	Poaceae	Grass family
58	<i>Echinochloa crus-galli</i>	barnyardgrass	Poaceae	Grass family
59	<i>Elymus repens</i>	quackgrass	Poaceae	Grass family
60	<i>Eragrostis cilianensis</i>	stinkgrass	Poaceae	Grass family
61	<i>Eriochloa villosa</i>	woolly cupgrass	Poaceae	Grass family
62	<i>Hordeum jubatum</i>	foxtail barley	Poaceae	Grass family
63	<i>Panicum capillare</i>	witchgrass	Poaceae	Grass family
64	<i>Panicum dichotomiflorum</i>	fall panicum	Poaceae	Grass family
65	<i>Setaria verticillata</i>	bristly foxtail	Poaceae	Grass family
66	<i>Setaria pumila</i>	yellow foxtail	Poaceae	Grass family
67	<i>Setaria viridis</i>	green foxtail	Poaceae	Grass family
68	<i>Polygonum aviculare</i>	prostrate knotweed	Polygonaceae	Buckwheat family
69	<i>Fallopia convolvulus</i>	wild buckwheat	Polygonaceae	Buckwheat family
70	<i>Persicaria pensylvanica</i>	Pennsylvania smartweed	Polygonaceae	Buckwheat family
71	<i>Rumex crispus</i>	curly dock	Polygonaceae	Buckwheat family
72	<i>Galium aparine</i>	catchweed bedstraw	Rubiaceae	Madder family
73	<i>Solanum physalifolium</i>	hairy nightshade	Solanaceae	Nightshade family
74	<i>Solanum ptychanthum</i>	eastern black nightshade	Solanaceae	Nightshade family
75	<i>Solanum rostratum</i>	buffalobur	Solanaceae	Nightshade family

## 2021 NCWSS Collegiate Weed Contest Unknown Herbicide List

	Common name	Trade name	Herbicide family (WSSA SOA List)	Site of action	Timing	Rate (ai or ae/acre)	Adjuvant*
1	clethodim	Select Max	Cyclohexanedione	ACCCase inhibitor	POST	0.095 lb	COC, AMS
2	pinoxaden	Axial XL	Phenylpyrazoline	ACCCase inhibitor	POST	0.054 lb	None
3	quizalofop-ethyl	Assure II	Aryloxyphenoxy-propionate	ACCCase inhibitor	POST	0.062 lb	COC
4	halosulfuron-methyl	Permit	Sulfonylurea	ALS inhibitor	POST	0.031 lb	COC, AMS
5	imazethapyr	Pursuit	Imidazolinone	ALS inhibitor	POST	0.047 lb	COC, AMS
6	nicosulfuron	Accent Q	Sulfonylurea	ALS inhibitor	POST	0.031 lb	COC, AMS
7	thiencarbazone-methyl	Varro	Sulfonylaminocarbonyl-triazolinone	ALS inhibitor	POST	0.004 lb	NIS
8	glyphosate	Roundup PowerMax	Glycine	EPSPS inhibitor	POST	1.0 lb	AMS
9	glufosinate	Liberty 280 SL	Phosphinic acid	Glutamine synthetase inhibitor	POST	0.585 lb	AMS
10	mesotrione	Callisto	Triketone	HPPD inhibitor	POST	0.094 lb	COC, AMS
11	tembotrione	Laudis	Triketone	HPPD inhibitor	POST	0.082 lb	MSO, AMS
12	pendimethalin	Prowl H2O	Dinitroaniline	Microtubule assembly inhibitor	PRE	0.95 lb	None
13	acetochlor	Harness	Chloroacetamide	Very Long Chain Fatty Acid Inhibitor	PRE	1.5 lb	None
14	pyroxasulfone	Zidua	Isoxazoline	Very Long Chain Fatty Acid Inhibitor	PRE	0.16 lb	None
15	paraquat	Gramoxone 3 SL	Bipyridylum	Photosystem I electron diverter	POST	0.5 lb	NIS
16	atrazine	Aatrex	Triazine	Photosystem II inhibitor – Serine 264 binders	PRE	0.5 lb	None
17	bentazon	Basagran	Benzothiadiazinone	Photosystem II inhibitor site – Histidine 215 binders	POST	0.5 lb	MSO
18	bromoxynil	Buctril	Nitrile	Photosystem II inhibitor site – Histidine 215 binders	POST	0.25 lb	None
19	metribuzin	Tricor	Triazinone	Photosystem II inhibitor – Serine 264 binders	PRE	0.38 lb	None
20	carfentrazone-ethyl	Aim	Triazolinone	PPO inhibitor	POST	0.012 lb	COC, AMS
21	flumioxazin	Valor EZ	N-phenylphthalimide	PPO inhibitor	PRE	0.094 lb	None
22	fomesafen	Reflex	Diphenylether	PPO inhibitor	POST	0.188 lb	MSO
23	lactofen	Cobra	Diphenylether	PPO inhibitor	POST	0.16 lb	COC, AMS
24	saflufenacil	Sharpen	Pyrimidinedione	PPO inhibitor	PRE	0.045 lb	None
25	sulfentrazone	Spartan 4F	Triazolinone	PPO inhibitor	PRE	0.188 lb	None
26	2,4-D	2,4-D LV6	Phenoxy-carboxylic-acid	Auxin mimics	POST	0.5 lb	None
27	clopyralid	Stinger	Pyridine carboxylic acid	Auxin mimics	POST	0.094 lb	None
28	dicamba	Xtendimax	Benzoic acid	Auxin mimics	POST	0.5 lb	None

\*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

- 1) Corn
- 2) Soybean
- 3) Sunflower
- 4) Canola
- 5) Spring wheat
- 6) Sugar beet
- 7) Field pea
- 8) Pinto bean

- 1) Barnyardgrass
- 2) Waterhemp
- 3) Common lambsquarters
- 4) Common ragweed
- 5) Yellow foxtail
- 6) Venice mallow
- 7) Wild buckwheat
- 8) Kochia
- 9) Common cocklebur
- 10) Wild oat