

Sampling Protocol for Collecting Fresh Plant Tissue for Genetic Herbicide Resistance Testing

Contact Kristen Obeid: kristen.obeid@ontario.ca for sample collection kits

Sample Collection Kits Include:

- 1 “Ziploc” type plastic freezer bags (27 cm X 27 cm)
- 10 “Ziploc” type plastic freezer bags (16.5 cm X 15 cm)
- 10 Unwaxed paper coin envelopes with labels indicating required information
- Silica gel beads (10 grams)
- Sampling instructions

Harvesting plant samples:

- 1) Clearly label sample envelopes:
 - a. Grower name and address (if this cannot be provided, please ensure to include the GPS. Grower details are never released, all information is reported on a county level)
 - b. Field number
 - c. Sampling date
 - d. GPS coordinates or any information that would be useful in identifying the plant samples as well as the exact sampling location
 - e. Investigator name
- 2) Harvest a piece of young leaf tissue, about the size of a quarter
- 3) Place leaf sample in an unsealed paper coin envelope
 - a. Do not place samples from more than one plant in each envelope



- 4) To determine the percentage of resistant plants in a field or in an area of the field, collect at least 10 samples (10 envelopes) per field, each taken from a different plant. Before determining where to sample look for hot spots in the field that cannot be explained by equipment failure or weather issues.
- 5) Place the paper coin envelope in the plastic bag containing the silica gel beads.
- 6) Seal the plastic bag as soon as possible, removing as much air as possible (airtight).
- 7) The plant material should be dried after 24 hours.

8) **Genetic Tests Available**

| Weed Species | Herbicide Group (s) | Common Herbicide Trade Name (s) (provided ONLY as example herbicides commonly used in horticulture) | Target Site Mutation / Metabolic / Species Identification |
|--------------------------|---------------------|---|---|
| Amaranthus species | - | - | Species Identification |
| Brassica species | - | - | Species Identification |
| Brassica species | 9 | Glyphosate | Presence of transgene |
| Canada fleabane | 9 | Glyphosate | Target-site (P106S) |
| Common chickweed | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (P197Q & unpublished) |
| Common ragweed | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (W574L) |
| | 5 | Atrazine, Lorox, Sencor, Simazine, Sinbar | Target-site (V219I) |
| | 9 | Glyphosate | Target-site (P106S sequencing assay) |
| | 14 | Blazer, Reflex | Target-site (R98L & R98Q) |
| Eastern black nightshade | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (A205V) |
| Giant foxtail | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (unpublished) |
| Giant ragweed | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (W574L) |
| | 5 | Atrazine, Lorox, Sencor, Simazine, Sinbar | Target-site (V219I) |
| | 9 | Glyphosate | Target-site (P106S sequencing assay) |
| Green foxtail | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (unpublished) |
| Green pigweed | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (S653N & W574L) |
| | 5 | Atrazine, Lorox, Sencor, Simazine, Sinbar | Target-site (A251V, S264G, V219I & F274L) |
| | 14 | Aim, Authority*, Blazer, Chateau*, Goal, Reflex | Target-site (Δ G210 in PPX2L & R128I) |
| Italian ryegrass | 9 | Glyphosate | Target-site (P106S) |
| Lamb's-quarters | 5 | Atrazine, Sencor, Simazine, Sinbar | Target-site (S264G) |
| Large crabgrass | 1 | Assure, Poast Ultra, Select, Venture | Metabolic: ACCase gene amplification |
| Redroot pigweed | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (S653N & W574L) |
| | 5 | Atrazine, Lorox, Sencor, Simazine, Sinbar | Target-site (A251V, S264G, V219I & F274L) |
| | 14 | Aim, Authority*, Blazer, Chateau*, Goal, Reflex | Target-site (Δ G210 in PPX2L & R128I) |
| Waterhemp | 2 | Pinnacle, Prism, Pursuit, Sandea | Target-site (S653N & W574L) |
| | 5 | Atrazine, Sencor, Simazine, Sinbar | Target-site (A251V, S264G, V219I & F274L) |
| | 9 | Glyphosate | Metabolic: EPSPS gene amplification |
| | 14 | Aim, Authority*, Blazer, Chateau*, Goal, Reflex | Target-site (Δ G210 in PPX2L) |

Several of these tests were developed by other researchers and reproduced from the scientific literature.

* Much more research is required in this area.

9) Sample Submission Process

Samples need to be sent directly to:

TurnKey Genomics

c/o Chris Grainger

34 Hill Trail

Guelph, Ontario

N1E 7C5

519-635-4470

<https://turnkeygenomics.ca>

For all samples, please send an email to kristen.obeid@ontario.ca and Chris Grainger chris@turnkeygenomics.ca to let us know that a sample is being sent to the lab. Please document the tracking number of the package in the email.

If you would like to drop off a sample to the lab you must call ahead 519-635-4470 and let Chris Grainger know it is coming.