

Appendices

Appendix A.

Manufacturers of Pesticides Listed in Publication 812

ADAMA Agricultural Solutions Limited

300-191 Lombard Avenue
Winnipeg, Manitoba R3B 0X1
Tel 1-855-264-6262
www.adama.com/canada

Amvac Chemical Corporation

4695 MacArthur Court, Suite 1200
Newport Beach, CA US 92660
Tel 323-264-3910
www.amvac-chemical.com/

BASF Canada Inc.

100 Milverton Dr., 5th Floor
Mississauga, ON L5R 4H1
Tel 1-866-485-BASF (2273)
Fax 289-360-6000
www.agsolutions.ca

Bayer CropScience Inc.

679 Southgate Drive
2nd Floor
Guelph, ON N1G 4S2
Tel 1-888-283-6847
Fax 403-723-7488
www.bayercropscience.ca

Dow AgroSciences Solutions Centre

2100-450 1 St. SW
Calgary AB T2P 5H1
Tel 1-800-667-3852
Fax 1-888-296-6188
www.dowagro.ca

E.I. DuPont Canada Inc.

7070 Mississauga Rd., P.O. Box 2300
Streetsville, ON L5M 2J4
Tel 1-800-387-2122
Fax 905-821-5057
www.dupont.ca

Engage Agro Corp.

1030 Gordon St.
Guelph, ON N1G 4X5
Tel 519-826-7878
Fax 519-826-7675
www.engageagro.com

Gowan Company

370 Main St.
Yuma, AZ US 85364
Tel 1-800-883-1844, ext. 2
www.gowanco.com

HeadsUp Plant Protectants Ltd.

207 Queen Elizabeth Blvd. West
Box 519
Kamsack, SK S0A 1S0
www.sar-headsup.ca

Interprovincial Cooperative Ltd.

945 Marion St.
Winnipeg, MB R2J 0K7
Tel 204-233-3461
Fax 204-233-8462
www.ipco.ca

Macdermid Agricultural Solutions Canada Limited

400 Michener Road, Unit 2
Guelph, ON N1K 1E4

Monsanto Canada

900 – One Research Road
Winnipeg, MB R3T 6E3
Tel 1-800-667-4944
Fax 1-888-556-5565
www.monsanto.ca

Neudorff North America

P.O. Box 178
Brentwood Bay, BC V8M 1R3
Tel 250-652-5888
www.neudorffpro.com

Norac Concepts Inc.

P.O. Box 31097
Guelph, ON N1H 8K1
Tel 519-821-3633
Fax 519-821-2083
www.noracconcepts.com

Syngenta Canada Inc.

140 Research Lane
Guelph, ON N1G 4Z3
Tel 1-877-964-3682
Fax 1-877-214-5405
www.syngenta.ca

United Agri Products Canada Inc./

Loveland Products Canada Inc.

789 Donnybrook Dr.
Dorchester, ON N0L 1G5
Tel 1-800-265-4624
Tel 1-800-328-4678
Fax 519-268-8013
www.uap.ca

Valent BioSciences Canada, Ltd.

130 Research Lane, Unit 6
Guelph, ON N1G 5G3
Tel 519-767-9262
Fax 925-817-5026
www.valent.ca

Appendix B.

Ontario Ministry of Agriculture, Food and Rural Affairs Field Crop Advisory Staff List by Location

Location/role	Crop Advisory Staff	Tel/Fax	E-mail
Brighton Resource Centre 95 Dundas St. E., RR#3, Brighton, ON K0K 1H0		Tel 613-475-1630 Fax 613-475-3835	
Guelph OMAFRA 1 Stone Rd. W., Guelph, ON N1G 4Y2			
Crop Protection Program Lead	Denise Beaton	Tel 519-826-6594 Fax 519-826-4964	denise.beaton@ontario.ca
Minor Use Coordinator	Jim Chaput	Tel 519-826-3539 Fax 519-826-4964	jim.chaput@ontario.ca
Harrow Greenhouse and Processing Crops Research Centre, 2585 County Road 20, Harrow, ON N0R 1G0		Tel 519-738-2251 Fax 519-738-4564	
Kemptville Resource Centre P.O. Box 2004, Concession Road, Kemptville, ON K0G 1J0		Tel 613-258-8295 Fax 613-258-8392	
Cropping Systems Specialist	Scott Banks	Tel 613-258-8359	scott.banks@ontario.ca
Lindsay Resource Centre 322 Kent St. W., Lindsay, ON K9V 2Z9		Tel 705-324-6125 Fax 705-324-1638	
New Liskeard 280 Armstrong St., P.O. Box 4070, New Liskeard, ON P0J 1P0		Tel 1-800-461-6132 Fax 705-647-7993	
Ridgetown Resource Centre Agronomy Building, Ridgetown College, P.O. Box 400, Main St. E, Ridgetown, ON N0P 2C0		Tel 519-674-1690 Fax 519-674-1564	
Entomologist, Field Crops Program Lead	Tracey Baute	Tel 519-674-1696	tracey.baute@ontario.ca
Pathologist – Field Crops Program Lead	Albert Tenuta	Tel 519-674-1617	albert.tenuta@ontario.ca
Soil Management Specialist – Field Crops	Adam Hayes	Tel 519-674-1621	adam.hayes@ontario.ca
Simcoe Resource Centre P.O. Box 587, Blueline Rd. & Hwy #3, Simcoe, ON N3Y 4N5		Tel 519-426-7120 Fax 519-428-1142	
Application Technology Specialist	Jason Deveau	Tel 519-426-8934	jason.deveau@ontario.ca
Stratford Resource Centre 63 Lorne Ave. E., Suite 2B, Stratford, ON N5A 6S4		Tel 519-271-0280 Fax 519-273-5278	
Canola & Edible Beans Specialist	Meghan Moran	Tel 519-271-0083	meghan.moran@ontario.ca
Cereals Specialist	Joanna Follings	Tel 519-271-8180	joanna.follings@ontario.ca
Soil Fertility Specialist	Jake Munroe	Tel 519-271-9269	jake.munroe@ontario.ca
Soybean Specialist	Horst Bohner	Tel 519-271-5858	horst.bohner@ontario.ca
University of Guelph 50 Stone Rd. E., Guelph, ON N1G 2W1		Tel 519-824-4120	
Crop Innovations Specialist Crop Science Building	Ian McDonald	Tel 519-824-4120, ext. 56707 Fax 519-763-8933	ian.mcdonald@ontario.ca
Corn Specialist Crop Science Building	Ben Rosser	Tel 519-824-4120, ext. 54865 Fax 519-763-8933	ben.rosser@ontario.ca

Appendix B.

Ontario Ministry of Agriculture, Food and Rural Affairs Field Crop Advisory Staff List by Location

Location/role	Crop Advisory Staff	Tel/Fax	E-mail
Weed Management Specialist, Field Crops Crop Science Building, Room 303	Mike Cowbrough	Tel 519-824-4120, ext. 52580 Fax 519-763-8933	mike.cowbrough@ontario.ca
Vineland – University of Guelph 4890 Victoria Ave. N., P.O. Box 7000, Vineland Station, ON LOR 2E0		Tel 905-562-4141 Fax 905-562-3413	
Vineland Resource Centre Adv. Serv. Building, P.O. Box 8000, 4890 Victoria Ave. N., Vineland Station, ON LOR 2E0		Tel 905-562-4147 Fax 905-562-5933	
Woodstock Resource Centre P.O. Box 666, Hwy. #59 N, Woodstock, ON N4S 7Z5		Tel 519-537-6621 Fax 519-539-5351	
Field Crops Sustainability Specialist	Christine Brown	Tel 519-537-8305	christine.brown1@ontario.ca

Agricultural Information Contact Centre

Provides province-wide, toll-free technical and business information to commercial farms, agri-businesses and rural businesses.

1 Stone Rd. W.

Guelph, ON N1G 4Y2

Tel 519-826-4047

Toll-free 1-877-424-1300

Fax 519-826-7610

E-mail ag.info.omafra@ontario.ca

A complete list of Agriculture Development Branch staff can be found on the OMAFRA website at ontario.ca/omafra.

Appendix C.

Ontario Ministry of the Environment and Climate Change Regional Contact Information

REGION County	Address	Telephone/Fax
Central Region Toronto, Halton, Peel York, Durham, Muskoka, Simcoe	5775 Yonge St., 8th Floor Toronto, ON M2M 4J1	Tel 416-326-6700 Toll-free 1-800-810-8048 Fax 416-325-6345
West-Central Region Haldimand, Norfolk, Niagara, Hamilton-Wentworth, Dufferin, Wellington, Waterloo, Brant	Ontario Government Building 119 King St. W., 12th Floor Hamilton, ON L8P 4Y7	Tel 905-521-7640 Toll-free 1-800-668-4572 Fax 905-521-7820
Eastern Region Frontenac, Hastings, Lennox & Addington, Prince Edward, Leeds & Grenville, Prescott & Russell, Stormont/ Dundas & Glengarry, Haliburton, Peterborough, City of Kawartha Lakes, Northumberland, Renfrew, Ottawa, Lanark (Township of South Algonquin)	1259 Gardiners Rd., Unit 3 P.O. Box 22032 Kingston, ON K7M 8S5	Tel 613-549-4000 Toll-free 1-800-267-0974 Fax 613-548-6908
Southwestern Region Elgin, Middlesex, Oxford, Essex, Kent, Lambton, Bruce, Grey, Huron, Perth	733 Exeter Rd., 2nd Floor London, ON N6E 1L3	Tel 519-873-5000 Toll-free 1-800-265-7672 Fax 519-873-5020
Northern Region (EAST) Manitoulin, Nipissing, Parry Sound, Sudbury, Algoma (East), Timiskaming, Sault Ste. Marie	199 Larch St., Suite 1201 Sudbury, ON P3E 5P9	Tel 705-564-3237 Toll-free 1-800-890-8516 Fax 705-564-4180
Northern Region (West) Algoma (West), Cochrane, Kenora, Rainy River, Timmins, Thunder Bay	435 James St. S., Suite 331, 3rd Floor Thunder Bay, ON P7E 6S7	Tel 807-475-1205 Toll-free 1-800-875-7772 Fax 705-475-1754
Standards Development Branch	Pesticides Section 40 St. Clair Ave. W., 7th Floor Toronto, ON M4V 1M2	Tel 416-327-5519 Fax 416-327-2936
Environmental Approvals Branch	Pesticides Licensing 2 St. Clair Ave. W., 12A Floor Toronto, ON M4V 1L5	Tel 416-314-8001 Toll-free 1-800-461-6290 Fax 416-314-8452

Appendix D.
Other Contacts

**AGRICULTURE & AGRI-FOOD CANADA
RESEARCH CENTRES**

www.agr.gc.ca/index_e.php

Eastern Cereals and Oilseeds Research Centre

960 Carling Ave.
Ottawa, ON K1A 0C6
Tel 613-759-1858

Greenhouse and Processing Crops Centre

2585 County Road 20
Harrow, ON NOR 1G0
Tel 519-738-2251

Southern Crop Protection and Food Research Centre

1391 Sandford St.
London, ON N5V 4T3
Tel 519-457-1470

Vineland Research Farm

4902 Victoria Ave. N.
Vineland, ON LOR 2E0
Tel 905-562-4113

Guelph Food Research Centre

93 Stone Rd. W.
Guelph, ON N1G 5C9
Tel 519-829-2400

UNIVERSITY OF GUELPH

Main Campus

Guelph, ON N1G 2W1
Tel 519-824-4120
www.uoguelph.ca

Ridgetown Campus

Ridgetown, ON NOP 2C0
Tel 519-674-1500
www.ridgetownc.uoguelph.ca

Department of Plant Agriculture

www.plant.uoguelph.ca

Department of Plant Agriculture, Guelph

50 Stone Rd. E.
Guelph, ON N1G 2W1
Tel 519-824-4120, ext. 56083 or 52693

Department of Plant Agriculture, Simcoe

1283 Blueline Rd., Box 587
Simcoe, ON N3Y 4N5
Tel 519-426-7127

Department of Plant Agriculture, Vineland

Box 7000, 4890 Victoria Ave. N.
Vineland Station, ON LOR 2E0
Tel 905-562-4141

Lab Services Division

95 Stone Rd. W.
Guelph, ON N1H 8J7
Tel 519-767-6299
www.uoguelph.ca/labserv/

Trace Organic and Pesticide Contaminants

Tel 519-823-1268

Pest Diagnostic Clinic

Tel 519-767-6256

**VINELAND RESEARCH AND INNOVATION
CENTRE**

4890 Victoria Ave. N.
Vineland Station, ON LOR 2E0
Tel 905-562-0320
www.vinelandresearch.com

Appendix E.

Diagnostic Service

Samples for disease diagnosis, insect or weed identification, nematode counts and verticillium testing can be sent to:

University of Guelph
Laboratory Services Division
Pest Diagnostic Clinic
95 Stone Rd. W.
Guelph, ON N1H 8J7

Tel 519-767-6299
Fax 519-767-6240
E-mail afinfo@uoguelph.ca

www.guelphlabservices.com

Payment must accompany samples at the time of submission. Submission forms are available at: www.guelphlabservices.com/AFL/submit_samples.aspx.

How to Sample for Nematodes

Soil

When to sample

Soil and root samples can be taken at any time of the year that the soil is not frozen. In Ontario, nematode soil population levels are generally at their highest in May and June and again in September and October.

How to sample soil

Use a soil sampling tube, trowel or narrow-bladed shovel to take samples. Sample soil to a depth of 20–25 cm (8–10 in.). If the soil is bare, remove the top 2 cm (1 in.) prior to sampling. A sample should consist of 10 or more subsamples combined. Mix well. Then take a sample of 0.5–1 L (1 pint–1 quart) from this. No single sample should represent more than 2.5 ha (6.25 acres). Mix subsamples in a clean pail or plastic bag.

Sampling pattern

If living crop plants are present in the sample area, take samples within the row and from the area of the feeder root zone (with trees, this is the drip line).

Number of subsamples

Based on the total area sampled:

500 m ² (5,400 ft ²)	10 subsamples
500 m ² –0.5 ha (5,400 ft ² –1.25 acres)	25 subsamples
0.5 ha–2.5 ha (1.25–6.25 acres)	50 subsamples

Roots

For small plants, sample the entire root system plus adhering soil. For large plants, 10–20 g (½–1 oz.), dig fresh weight from the feeder root zone and submit.

Problem areas

Take soil and root samples from the margins of the problem area where the plants are still living. If possible, also take samples from healthy areas in the same field. If possible, take both soil and root samples from problem and healthy areas in the same field.

Sample Handling

Soil samples

Place in plastic bags as soon as possible after collecting.

Root samples

Place in plastic bags and cover with moist soil from the sample area.

Storage

Store samples at 5°C–10°C and do not expose them to direct sunlight or extreme heat or cold (freezing). Only living nematodes can be counted. Accurate counts depend on proper handling of samples.

Submitting Plant for Disease Diagnosis or Identification

Sample submission forms

Forms can be obtained from your local Ministry of Agriculture, Food and Rural Affairs (OMAFRA) office or by calling the Agricultural Information Contact Centre at 1-877-424-1300. Carefully fill in all the categories on the form. In the space provided, draw the most

obvious symptom and the pattern of the disease in the field. It is important to include the cropping history of the area for the past 3 years and pesticide use records from this year.

Choose a complete, representative sample showing early symptoms. Submit as much of the plant as is practical, including the root system, or several plants showing a range of symptoms. If symptoms are general, collect the sample from an area where they are of intermediate severity. Completely dead material is usually inadequate for diagnosis.

With plant specimens submitted for identification, include at least a 20–25-cm sample of the top portion of the stem with lateral buds, leaves, flowers or fruits in identifiable condition. Wrap plants in newspaper and put in a plastic bag. Tie the root system off in a separate plastic bag to avoid the soil drying out and contaminating the leaves. Do not add moisture, as this encourages decay in transit. Cushion specimens and pack in a sturdy box to avoid damage during shipping. Avoid leaving specimens to bake or freeze in a vehicle or in a location where they could deteriorate.

Delivery

Deliver to the Pest Diagnostic Clinic as soon as possible by first class mail or courier at the beginning of the week.

Submitting Insect Specimens for Identification

Collecting samples

Place dead, hard-bodied insects in vials or boxes and cushion with tissues or cotton. Place soft-bodied insects and caterpillars in vials containing alcohol. Do not use water, as this results in rot. Do not tape insects to paper or send them loose in an envelope.

Place live insects in a container with enough plant “food” to support them during transit. Be sure to write “live” on the outside of the container.

Appendix F.

Pesticide Groups Based on Sites of Action — Insecticides

The classification scheme listed below is adapted from the Insecticide Action Committee Mode of Action Classification (IRAC) V8, December 2015.

Group #	Primary Site of Action	Group Name	Product name(s)¹
1A	acetylcholine esterase (AChE) inhibitors	carbamates	Lannate Toss-N-Go 90 SP, Sevin XLR Plus
1B	acetylcholine esterase (AChE) inhibitors	organophosphate	Counter 15 G, Cygon 480, Imidan 50 WP, Lagon 480 EC, Lorsban 4E, Lorsban 15 G, Malathion 500 E, Monitor 480, Pyrifos 15 G, Pyrinex 480 EC
3A	sodium channel modulators	pyrethroid	Ambush 500EC, Concep, Decis 5 EC, Endigo, Force 3.0G, Matador 120 EC, Pounce 384 EC, Silencer 120EC, Voliam Xpress
4A	nicotinic acetylcholine receptor competitive modulators	neonicotinoids	Acceleron IX-409, Alias 240 SC, Concept, Cruiser 350FS, Cruiser 5FS, Cruiser Maxx Vibrance Beans, Endigo, Gaucho 480 FL, Gaucho GS, Helix Vibrance, NipsIt INSIDE 600, NipsIt SUITE, Poncho 600FS, Prosper, Sombrero 600FS, Stress Shield 600
4C	nicotinic acetylcholine receptor competitive modulators	sulfoximines	Closer, Transform WG
4D	nicotinic acetylcholine receptor competitive modulators	butenolides	Sivanto Prime
5	nicotinic acetylcholine allosteric modulators	naturalyte/spinosyns	Delegate, Delegate WG, Success 480 SC
11A	microbial disruptors of insect midgut membranes	biologicals	Bioprotect CAF, Dipel 2X DF, Thuricide HPS
18	ecdysone receptor agonists	diacylhydrazines	Intrepid
23	inhibitors of acetyl CoA carboxylase	tetronic and tetramic acid derivatives	Movento, Oberon
24	mitochondrial complex IV electron transport inhibitors	inorganics (aluminum phosphide)	Fumitoxin, Gastoxin, Phostoxin
28	ryanodine receptor modulators	diamides	Coragen, Fortenza, Lumiderm, Lumivia, Voliam Xpress

¹ Some products are listed in more than one group because they contain more than one active ingredient from different groups.

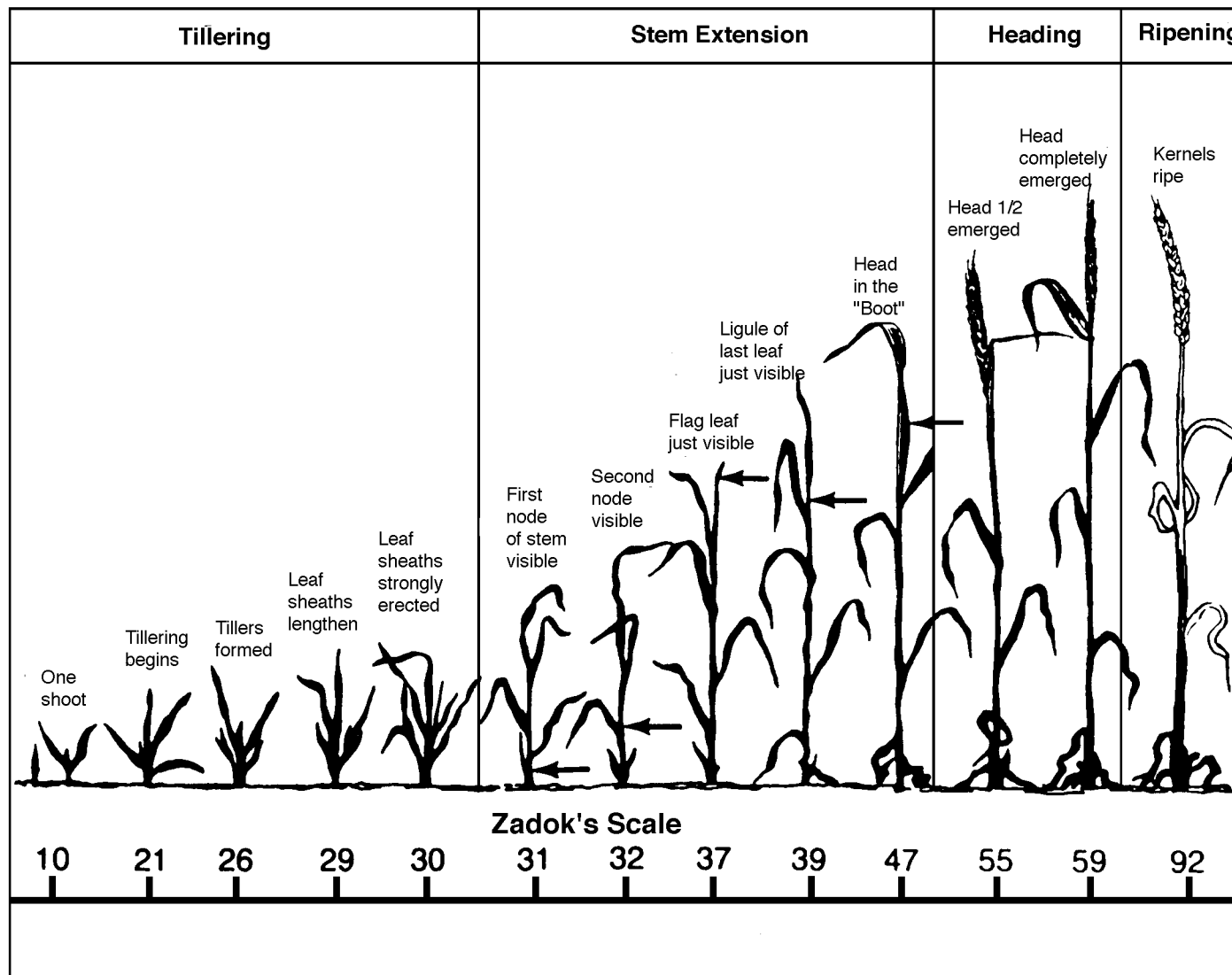
Appendix G.

Pesticide Groups Based on Sites of Action — Fungicides

This classification scheme is based on the Fungicide Resistance Action Committee (FRAC) Code List, 2015.

Group #	Primary Site of Action	Group Name	Product name(s)	Risk of Developing Resistance
1	mitosis and cell division (β -tubulin assembly)	MBC (methyl-benzimidazole carbamates)	DCT, Maxim Quattro, MERTECT SC, Senator 70 WP	high
2	digital transduction (MAP/Histidine-kinase)	dicarboximide	Overall 240 SC, Ronilan EG, Rovral WP	medium to high
3	C14 - demethylation in sterol biosynthesis	DMI (demethylation inhibitors) sometimes referred to as sterol inhibitors (SI)	Blanket AP, Bumper 432 EC, Caramba, Cotegra, Dividend XL RTA, EverGol Energy, Folicur 250 EW, Fullback 125 SC, Gemini, Headline AMP, Helix Vibrance, NipsIt SUITE, Proline 480 SC, Propulse, Prosaro XTR, Quash, Quilt, Rancona Pinnacle, Raxil MD, Raxil Pro MD, Raxil T, Stratego PRO, Tilt 250 E, Topas 250 E, Topnotch, Trivapro A + Trivapro B, Twinline, Vibrance Quattro, Vibrance XL, Vortex FL	medium
4	RNA polymerase 1	PA (phenylamides)	Allegiance FL, Apron FL, Apron Maxx RFC, Apron Maxx RTA, Apron XL LS, Cruiser Maxx Vibrance Beans, Dividend XL RTA, EverGol Energy, Helix Vibrance, Maxim Quattro, NipsIt SUITE, Prosper, Rancona Pinnacle, Raxil MD, Raxil Pro MD, Vibrance Maxx RFC, Vibrance Quattro, Vibrance XL	high
7	respiration (complex II: succinate-dehydrogenase)	SDHI (succinate dehydrogenase inhibitors)	Anchor, Cotegra, Cruiser Maxx Vibrance Beans, EverGol Energy, Fontelis, Gaucho CS, ILeVO, Lance WDG, Priaxor, Propulse, Prosper, Trivapro A + Trivapro B, Vertisan, Vibrance Maxx RFC, Vibrance Quattro, Vitaflo 280, Vitavax RS	medium
9	amino acid and protein synthesis (methionine biosynthesis)	AP (aniline-pyrimidines)	Astound	medium
11	respiration (complex III: cytochrome bc ₁ , Qo site)	QoI (quinone outside inhibitors)	Acapela, Blanket AP, Cabrio EG, Dynasty 100FS, Evito 480SC, Headline AMP, Headline EC, Nufarm Propiconazole, Maxim Quattro, Priaxor, Quadris, Quilt, Reason 500 SC, S-2200 3.2 FS, S-2200 4SC, Stamina Corn, Stratego PRO, Tanos 50 DF, Trilex FL, Topnotch, Trivapro A + Trivapro B, Twinline	high
12	signal transduction (MAP/Histidine-kinase)	PP (phenyl pyrroles)	Apron Maxx RFC, Apron Maxx RTA, Astound, Cruiser Maxx Vibrance Beans, Helix Vibrance, Maxim 480 FS, Maxim Quattro, Proseed, Vibrance Maxx RFC, Vibrance Quattro, Vibrance XL	low to medium
14	lipid synthesis and membrane integrity (lipid peroxidation (proposed))	AH (aromatic hydrocarbon)	Botran 75 W, Quintozene 75 WP	low to medium
22	mitosis (β -tubulin assembly)	bensamides	INTEGO Solo	low to medium
29	respiration (uncoupler of oxidative phosphorylation)	2,6-dinitro-anilines	Allegro 500F	low
44	lipid synthesis and membrane integrity (microbial disrupters of pathogen cell membranes)	microbial	Clariva pn, Contans WG, Serenade OPTI, Votivo 240 FS	resistance not known
M1	multi-site, contact	inorganic	Copper 53 W, Copper Spray, Cueva, Kocide 101 WP, Kocide DF, Microscopic Sulphur, Oxidate, Parasol WP	low
M3	multi-site, contact	dithiocarbamates and relatives	Acrobat MZ, Anchor, Dithane DG Rainshield, Ferbam 76 WDG, Gaucho CS, Gavel 75 DF, Gemini, Manzate DF, Penncozeb 80, Polyram DF, Prosper, Ridomil Gold, Thiram 75 WP, Vitaflo 280, Vitavax RS, Zineb 80 W	low
M4	multi-site, contact	phthalimide	Captan, DCT, Maestro 75 DF, Supra Captan 80 WDG	low
M5	multi-site, contact	chloronitriles	Bravo 500, Tatoo C	low

Appendix H.
Cereal Growth Stages



Appendix I.
The Metric System

Metric units	Dry weight conversions (approximate)	Application rate conversions
Linear measures (length)	Metric Imperial	Metric to Imperial or U.S. (approximate)
10 millimetres (mm) = 1 centimetre (cm)	grams or kilograms/hectare ounces or pounds/acre	litres per hectare × 0.09 = Imp. gallons per acre
100 centimetres (cm) = 1 metre (m)	100 g/ha = 1½ oz/acre	litres per hectare × 0.11 = U.S. gallons per acre
1,000 metres = 1 kilometre (km)	200 g/ha = 3 oz/acre	litres per hectare × 0.36 = Imp. quarts per acre
Square measures (area)	300 g/ha = 4¼ oz/acre	litres per hectare × 0.43 = U.S. quarts per acre
100 m × 100 m = 10,000 m ² = 1 hectare (ha)	500 g/ha = 7 oz/acre	litres per hectare × 0.71 = Imp. pints per acre
100 ha = 1 square kilometre (km ²)	700 g/ha = 10 oz/acre	litres per hectare × 0.86 = U.S. pints per acre
Cubic measures (volume)	1.10 kg/ha = 1 lb/acre	millilitres per hectare × 0.014 = U.S. fluid ounces per acre
Dry measure	1.50 kg/ha = 1¼ lb/acre	grams per hectare × 0.014 = ounces per acre
1,000 cubic millimetres (mm ³) = 1 cubic centimetre (cm ³)	2.00 kg/ha = 1¾ lb/acre	kilograms per hectare × 0.89 = pounds per acre
1,000,000 cm ³ = 1 cubic metre (m ³)	2.50 kg/ha = 2¼ lb/acre	tonnes per hectare × 0.45 = tons per acre
Liquid measure	3.25 kg/ha = 3 lb/acre	Imperial or U.S. to metric (approximate)
1,000 millilitres (mL) = 1 litre (L)	4.00 kg/ha = 3½ lb/acre	Imp. gallons per acre × 11.23 = litres per hectare (L/ha)
100 L = 1 hectolitre (hL)	5.00 kg/ha = 4½ lb/acre	U.S. gallons per acre × 9.35 = litres per hectare (L/ha)
Weight-volume equivalents (for water)	6.00 kg/ha = 5¼ lb/acre	Imp. quarts per acre × 2.8 = litres per hectare (L/ha)
(1.00 kg) 1,000 grams = 1 litre (1.00 L)	7.50 kg/ha = 6¾ lb/acre	U.S. quarts per acre × 2.34 = litres per hectare (L/ha)
(0.50 kg) 500 g = 500 mL (0.50 L)	9.00 kg/ha = 8 lb/acre	Imp. pints per acre × 1.4 = litres per hectare (L/ha)
(0.10 kg) 100 g = 100 mL (0.10 L)	11.00 kg/ha = 10 lb/acre	U.S. pints per acre × 1.17 = litres per hectare (L/ha)
(0.01 kg) 10 g = 10 mL (0.01 L)	13.00 kg/ha = 11½ lb/acre	Imp. fluid ounces per acre × 70 = millilitres per hectare (mL/ha)
(0.001 kg) 1 g = 1 mL (0.001 L)	15.00 kg/ha = 13½ lb/acre	U.S. fluid ounces per acre × 73 = millilitres per hectare (mL/ha)
Weight measures	Liquid equivalents (approximate)	tons per acre × 2.24 = tonnes per hectare (t/ha)
1,000 milligrams (mg) = 1 gram (g)	50 L/ha = 4.45 gal/acre (5.35 US gal/acre)	pounds per acre × 1.12 = kilograms per hectare (kg/ha)
1,000 g = 1 kilogram (kg)	100 L/ha = 8.90 gal/acre (10.70 US gal/acre)	pounds per acre × 0.45 = kilograms per acre (kg/acre)
1,000 kg = 1 tonne (t)	150 L/ha = 13.35 gal/acre (16.05 US gal/acre)	ounces per acre × 70 = grams per hectare (g/ha)
1 mg/kg = 1 part per million (ppm)	200 L/ha = 17.80 gal/acre (21.40 US gal/acre)	Metric conversions
Dry-liquid equivalents	250 L/ha = 22.25 gal/acre (26.75 US gal/acre)	5 mL = 1 tsp
1 cm ³ = 1 mL	300 L/ha = 26.70 gal/acre (32.10 US gal/acre)	15 mL = 1 tbsp
1 m ³ = 1,000 L		28.5 mL = 1 imp. fl. oz.

Conversion tables – metric to imperial (approximate)

Length
1 millimetre (mm) = 0.04 inches
1 centimetre (cm) = 0.40 inches
1 metre (m) = 39.40 inches
1 metre (m) = 3.28 feet
1 metre (m) = 1.09 yards
1 kilometre (km) = 0.62 miles
Area
1 square centimetre (cm ²) = 0.16 square inches
1 square metre (m ²) = 10.77 square feet
1 square metre (m ²) = 1.20 square yards
1 square kilometre (km ²) = 0.39 square miles
1 hectare (ha) = 107,636 square feet
1 hectare (ha) = 2.5 acres
Volume (dry)
1 cubic centimetre (cm ³) = 0.061 cubic inches
1 cubic metre (m ³) = 1.31 cubic yards
1 cubic metre (m ³) = 35.31 cubic feet
1,000 cubic metres (m ³) = 0.81 acre-feet
1 hectolitre (hL) = 2.8 bushels
Volume (liquid)
1 millilitre (mL) = 0.035 fluid ounces (Imp.)
1 litre (L) = 1.76 pints (Imp.)
1 litre (L) = 0.88 quarts (Imp.)
1 litre (L) = 0.22 gallons (Imp.)
1 litre (L) = 0.26 gallons (U.S.)
Weight
1 gram (g) = 0.035 ounces
1 kilogram (kg) = 2.21 pounds
1 tonne (t) = 1.10 short tons
1 tonne (t) = 2,205 pounds
Pressure
1 kilopascal (kPa) = 0.15 pounds/in. ²
Speed
1 metre per second = 3.28 feet per second
1 metre per second = 2.24 miles per hour
1 kilometre per hour = 0.62 miles per hour
Temperature
°F = (°C × 5/9) + 32

Conversion tables – imperial to metric (approximate)

Length
1 inch = 2.54 cm
1 foot = 0.30 m
1 yard = 0.91 m
1 mile = 1.61 km
Area
1 square foot = 0.09 m ²
1 square yard = 0.84 m ²
1 acre = 0.40 ha
Volume (dry)
1 cubic yard = 0.76 m ³
1 bushel = 36.37 L
Volume (liquid)
1 fluid ounce (Imp.) = 28.41 mL
1 pint (Imp.) = 0.57 L
1 gallon (Imp.) = 4.55 L
1 gallon (U.S.) = 3.79 L
Weight
1 ounce = 28.35 g
1 pound = 453.6 g
1 ton = 0.91 tonne
Pressure
1 pound per square inch = 6.90 kPa
Temperature
°C = (°F – 32) × 5/9

Abbreviations

%	= per cent
ai	= active ingredient
AP	= agricultural powder
cm	= centimetre
cm ²	= square centimetre
CS	= capsule suspension
DF	= dry flowable
DG	= dispersible granular
DP	= dispersible powder
E	= emulsifiable
EC	= electrical conductivity
e.g.	= for example
F	= flowable
g	= gram
Gr	= granules, granular
ha	= hectare
kg	= kilogram
km/h	= kilometres per hour
kPa	= kilopascal
L	= litre
m	= metre
m ²	= square metre
mL	= millilitre
mm	= millimetre
m/s	= metres per second
SC	= sprayable concentrate
SP	= soluble powder
t	= tonne
W	= wettable (powder)
WDG	= water dispersible granular
WG	= wettable granule
WP	= wettable powder

Appendix J.
Field Record Form

YEAR _____																	
	Field I.D.				Field I.D.				Field I.D.				Field I.D.				
Acreage																	
Soil Type																	
Soil Fertility	pH	N	P	K	pH	N	P	K	pH	N	P	K	pH	N	P	K	
Tillage																	
Variety/Hybrid																	
Seeding Rate																	
Seeding Date																	
Seed Treatment																	
Fertilizer/Lime product, rate, timing																	
Manure Application																	
Herbicides																	
Rate																	
Crop Stage																	
Date																	
Yield																	
Harvest Date																	
Moisture																	
Test Wt/Grade																	
Notes																	

Appendix K.
Field Scouting Report

Farm: _____ **Scout:** _____ **Date:** _____ **Time:** _____

Field: _____ **Acreage:** _____ **Crop:** _____ **Plant Population:** _____

Crop Growth Stage, Height and Condition: _____

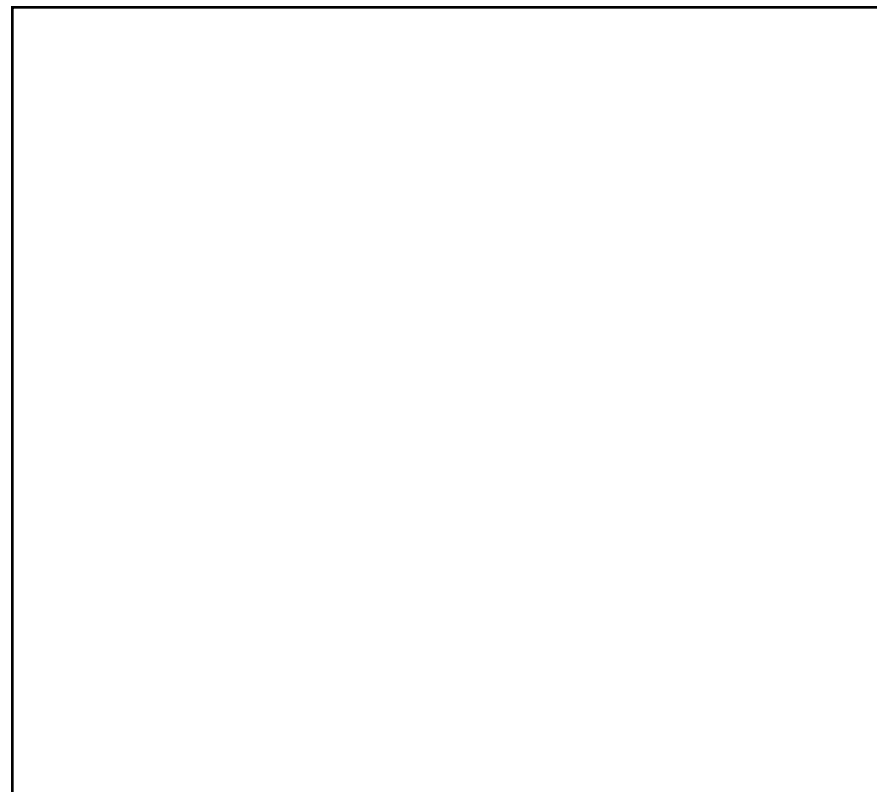
Soil Condition: _____

Weeds	Growth Stage	Pressure/Density

Insects	Stage	Pressure/Density

Diseases	Stage	Pressure/Density

Field Map: Use the blank area below to sketch in the location of weeds, insects, disease patches, crop condition, including GPS coordinates.



Field Scout's Comments: _____

Action Recommended: _____
