

TraceCOMPLETE: Reported Pathogens and Other Pests

Introduction: How to use this document

Pests can have many different common names and infect different crops, and scientific (Latin) names can be updated over time. The names and hosts reported by Trace Genomics are curated by expert biologists and agronomists to include the most up to date scientific name and a single common name for a given crop.

1. Finding a pest of interest

This document is sorted alphabetically by crop, and then alphabetically by disease/pest common name. Within each section is a table where the common name is in the left column and the corresponding Latin name is in the second column. If a pest of interest is not listed under a particular crop, search the document for the scientific name of the pest. It may be detectable but reported under a different crop host. For example, *Botrytis cinerea* infects over 50 crops ([source](#)) and is detected by Trace but may not be listed under each of its possible hosts.

The common names reported by Trace are those that are most frequently used by agronomists and farmers. If a pest of interest is not listed using one common name, search for the scientific name as it may be listed under another common name. For example, in canola: *Plenodomus lingam* is reported here as Bacterial Black Rot but is also known as Black Leg.

In addition to having multiple common names, taxonomists (biologists who classify organisms) may change the scientific name of pests if enough evidence is found to place it into a different or new genus. The Latin names reported here and on TraceVIEW are the most scientifically up to date (09/01/2023)¹, though previous names may be used in applied settings by agronomists and growers.

In order for a pest to be detectable and reported by Trace Genomics, it must have a fully sequenced genome in our database (see Appendix A for more information). If a pest of interest is not listed, you can email your suggestion to support@tracegenomics.com.

¹ One exception to this is recently re-classified species from the genus *Pythium* into the new genus *Globisporangium*. Pathogens now classified as *Globisporangium* are included in *Pythium* spp.

2. Definitions

Many crops have some pests reported as disease *complexes*, which are cases where different pathogen species cause the same or similar symptoms on a host crop. These have been manually curated by a Trace Genomics agronomist to ensure the reported complexes are composed of causative agents where the treatment or management plan is the same. For example, Fusarium Stalk Rot Complex is reported in corn and is composed of two species: *Fusarium proliferatum* and *Fusarium subglutinans*.

Some pests listed herein are structured as a genus name followed by spp., which is a plural abbreviation for “species”. For example, if *Pythium* spp. was reported for a sample, this indicates that multiple species belonging to the genus *Pythium* were identified, though perhaps not at a species level.

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Alfalfa

Aphanomyces Root Rot	<i>Aphanomyces euteiches</i>
Bacterial Wilt	<i>Clavibacter michiganensis</i>
Damping-Off	<i>Pythium spp.</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Rhizoctonia Root Canker	<i>Rhizoctonia solani</i>
Verticillium Wilt	<i>Verticillium alfalfae</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Almond

Alternaria Leaf Spot	<i>Alternaria alternata</i>
Anthracnose	<i>Colletotrichum acutatum</i>
Armillaria Root Rot	<i>Armillaria mellea</i>
	<i>Armillaria tabescens</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Phytophthora Root And Crown Rot	<i>Phytophthora cactorum</i>
	<i>Phytophthora cambivora</i>
	<i>Phytophthora cinnamomi</i>
	<i>Phytophthora citricola</i>
	<i>Phytophthora cryptogea</i>
	<i>Phytophthora nicotianae</i>
Root And Basal Rot Of Almonds	<i>Phytophthora syringae</i>
	<i>Dactylonectria macrodidyma</i>
Root-Knot Nematode	<i>Dactylonectria torresensis</i>
	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
Verticillium Wilt	<i>Meloidogyne javanica</i>
	<i>Verticillium dahliae</i>

Apple

Alternaria Rot	<i>Alternaria alternata</i>
Armillaria Root Rot	<i>Armillaria mellea</i>
Black Root Rot	<i>Xylaria polymorpha</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Phytophthora Root And Crown Rot	<i>Phytophthora spp.</i>
Verticillium Wilt	<i>Verticillium spp.</i>

Artichoke

Clubroot	<i>Plasmodiophora brassicae</i>
Damping-Off	<i>Pythium spp.</i>
Fusarium Wilt	<i>Fusarium spp.</i>
Gray Mold	<i>Botrytis cinerea</i>
Phytophthora	<i>Phytophthora spp.</i>
Rhizoctonia Root Rot	<i>Rhizoctonia solani</i>
Sclerotinia	<i>Sclerotinia spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Asparagus

Fusarium Wilt And Rot	<i>Fusarium proliferatum</i>
	<i>Fusarium verticillioides</i>

Avocado

Anthracoese	<i>Colletotrichum gloeosporioides</i>
	<i>Colletotrichum spp.</i>
Armillaria Root Rot	<i>Armillaria mellea</i>
Phytophthora Root Rot	<i>Phytophthora cinnamomi</i>
Pythium Root Rot	<i>Pythium spp.</i>
Rhizoctonia Root Rot	<i>Rhizoctonia solani</i>
	<i>Thanatephorus cucumeris</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Barley

Bacterial Kernel Blight	<i>Pseudomonas syringae</i>
Bacterial Streak	<i>Xanthomonas translucens</i>
Black Point	<i>Alternaria</i> spp.
Covered Smut	<i>Ustilago hordei</i>
Ergot	<i>Claviceps purpurea</i>
Gray Leaf Spot	<i>Pyricularia grisea</i>
Pythium Root Rot	<i>Pythium arrhenomanes</i>
	<i>Pythium</i> spp.
	<i>Pythium graminicola</i>
Rhizoctonia Root Rot	<i>Rhizoctonia solani</i>
	<i>Thanatephorus cucumeris</i>
Seedling Blight	<i>Bipolaris sorokiniana</i>
	<i>Fusarium culmorum</i>
	<i>Fusarium graminearum</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Blackberry

Armillaria Root Rot	<i>Armillaria mellea</i>
Botrytis Fruit Rot	<i>Botrytis cinerea</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Phytophthora Root Rot	<i>Phytophthora fragariae</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Blueberry

Anthracnose	<i>Colletotrichum acutatum</i>
	<i>Colletotrichum fioriniae</i>
	<i>Colletotrichum gloeosporioides</i>
Armillaria Root Rot	<i>Armillaria gallica</i>
	<i>Armillaria mellea</i>
	<i>Armillaria solidipes</i>
Bacterial Blight	<i>Pseudomonas syringae</i>

Crown Gall	<i>Agrobacterium rubi</i>
	<i>Agrobacterium tumefaciens</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Phytophthora Root Rot	<i>Phytophthora cinnamomi</i>
Sclerotinia Rot	<i>Sclerotinia spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Brassica

Bacterial Black Rot	<i>Plenodomus lingam</i>
	<i>Xanthomonas campestris</i>
Bottom Rot	<i>Rhizoctonia solani</i>
Clubroot	<i>Plasmodiophora brassicae</i>
Fusarium Yellows	<i>Fusarium oxysporum</i>
Head Rot	<i>Alternaria brassicicola</i>
Pythium	<i>Pythium spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>
White Mold	<i>Sclerotinia spp.</i>
White Rust	<i>Albugo candida</i>

Canola

Alternaria Black Spot	<i>Alternaria brassicicola</i>
Bacterial Black Rot	<i>Plenodomus lingam</i>
	<i>Xanthomonas campestris</i>
Clubroot	<i>Plasmodiophora brassicae</i>
Root Rot	<i>Fusarium spp.</i>
	<i>Pythium spp.</i>
	<i>Rhizoctonia solani</i>
Sclerotinia Stem Rot	<i>Sclerotinia sclerotiorum</i>
Verticillium	<i>Verticillium longisporum</i>

Carrot

Bacterial Soft Rot	<i>Dickeya dadantii</i>
	<i>Pectobacterium atrosepticum</i>
	<i>Pectobacterium carotovorum</i>
Black Root Rot	<i>Berkeleyomyces basicola</i>
Carrot Cyst Nematode	<i>Heterodera carotae</i>
Cottony Rot	<i>Sclerotinia minor</i>
	<i>Sclerotinia sclerotiorum</i>
Crown Rot	<i>Rhizoctonia solani</i>
Damping Off	<i>Fusarium spp.</i>
	<i>Pythium spp.</i>
Phytophthora Root Rot	<i>Phytophthora spp.</i>
Root Dieback	<i>Globisporangium irregulare</i>
Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne chitwoodi</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
	<i>Meloidogyne spp.</i>
Southern Bacterial Wilt	<i>Ralstonia solanacearum</i>
Southern Blight	<i>Athelia rolfsii</i>

Celery

Bacterial Leafspot	<i>Pseudomonas syringae</i>
Crater Rot	<i>Rhizoctonia solani</i>
Early Blight	<i>Cercospora apii</i>
Fusarium Yellows	<i>Fusarium oxysporum</i>
Pink Rot	<i>Sclerotinia sclerotiorum</i>

Cereal Rye

Anthracnose	<i>Colletotrichum graminicola</i>
Common Root Rot And Seedling Blight	<i>Bipolaris sorokiniana</i>
Fusarium Head Blight	<i>Fusarium avenaceum</i>
	<i>Fusarium culmorum</i>
	<i>Fusarium graminearum</i>
Pythium Root Rot	<i>Pythium spp.</i>
Rhizoctonia Root Rot	<i>Rhizoctonia solani</i>

Cherry

Armillaria Root Rot	<i>Armillaria mellea</i>
Bacterial Canker	<i>Pseudomonas syringae</i>
Botrytis Blossom Blight And Fruit Rot	<i>Botrytis cinerea</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Phytophthora Root And Crown Rot	<i>Phytophthora spp.</i>
Ripe Fruit Rot	<i>Rhizopus spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>
Wood-Decay Fungi	<i>Ganoderma spp.</i>
	<i>Phellinus spp.</i>
	<i>Trametes spp.</i>

Chickpea

Alternaria Blight	<i>Alternaria alternata</i>
Ascochyta Blight	<i>Ascochyta rabiei</i>
Black Root Rot	<i>Fusarium solani</i>
Botrytis Gray Mold	<i>Botrytis cinerea</i>
Damping-Off Complex	<i>Globisporangium debaryanum</i>
	<i>Globisporangium irregulare</i>
	<i>Globisporangium ultimum</i>
	<i>Pythium spp.</i>
Downy Mildew	<i>Peronospora spp.</i>
Dry Root Rot	<i>Macrophomina phaseolina</i>

Fusarium Root Rot Complex	<i>Fusarium acuminatum</i>
	<i>Fusarium avenaceum</i>
	<i>Fusarium equiseti</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Phytophthora Root Rot Complex	<i>Phytophthora citricola</i>
	<i>Phytophthora cryptogea</i>
Root-Knot Nematode	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
Sclerotinia Stem Rot Complex	<i>Sclerotinia sclerotiorum</i>
	<i>Sclerotinia trifoliorum</i>
Seed Rot	<i>Aspergillus flavus</i>
	<i>Trichothecium roseum</i>
Trichoderma Foot Rot	<i>Trichoderma harzianum</i>
Verticillium Wilt Complex	<i>Verticillium albo-atrum</i>
	<i>Verticillium dahliae</i>

Cilantro

Bacterial Leaf Spot	<i>Pseudomonas syringae</i>
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Citrus

Alternaria Rot	<i>Alternaria</i> spp.
Anthracnose	<i>Colletotrichum gloeosporioides</i>
Anthracnose Leaf Blight	<i>Colletotrichum graminicola</i>
Armillaria Root Rot	<i>Armillaria mellea</i>
Bacterial Blast (Citrus Blast)	<i>Pseudomonas syringae</i>
Botrytis Diseases And Disorders	<i>Botrytis cinerea</i>
Dothiorella Gummosis	<i>Neofusicoccum ribis</i>
Dry Root Rot	<i>Fusarium haematococcum</i>
	<i>Fusarium solani</i>
Phytophthora Root Rot	<i>Phytophthora hibernalis</i>
	<i>Phytophthora nicotianae</i>
	<i>Phytophthora palmivora</i>
	<i>Phytophthora syringae</i>

Corn

Anthracnose Leaf Blight	<i>Colletotrichum graminicola</i>
Aspergillus Ear Rot	<i>Aspergillus flavus</i>
	<i>Aspergillus parasiticus</i>
Bacterial Leaf Streak	<i>Xanthomonas vasicola</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Common Rust	<i>Puccinia sorghi</i>
Common Smut	<i>Ustilago maydis</i>
Corn Rootworm (Western)	<i>Diabrotica virgifera</i>
Corn/Carbonum Leaf Spot	<i>Bipolaris zeicola</i>
Diplodia Ear Rot And Stalk Rot	<i>Stenocarpella maydis</i>
Fusarium Root And Crown Rot Complex	<i>Fusarium acuminatum</i>
	<i>Fusarium boothii</i>
	<i>Fusarium equiseti</i>
	<i>Fusarium incarnatum</i>
	<i>Fusarium oxysporum</i>
	<i>Fusarium solani</i>
Fusarium Stalk Rot Complex	<i>Fusarium proliferatum</i>
	<i>Fusarium subglutinans</i>
Gibberella Ear Rot	<i>Fusarium graminearum</i>
Goss's Wilt	<i>Clavibacter michiganensis</i>
Gray Leaf Spot	<i>Cercospora zea-maydis</i>
Northern Corn Leaf Blight	<i>Exserohilum turcicum</i>
Pythium Root Rot Complex	<i>Globisporangium debaryanum</i>
	<i>Globisporangium irregulare</i>
	<i>Globisporangium ultimum</i>
	<i>Globisporangium paroecandrum</i>
Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne chitwoodi</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
	<i>Meloidogyne spp.</i>
Seed Rot And Seedling Blight	<i>Fusarium spp.</i>

Seedling Blight	<i>Penicillium oxalicum</i>
Seedling Blight And Root Rot	<i>Rhizoctonia solani</i>
Southern Leaf Blight	<i>Bipolaris maydis</i>
Southern Rust	<i>Puccinia polysora</i>
Stewart's Bacterial Leaf Blight	<i>Pantoea stewartii</i>
Tar Spot	<i>Phyllachora maydis</i>

Cotton

Alternaria Leaf Spot Complex	<i>Alternaria alternata</i>
	<i>Alternaria macrospora</i>
Bacterial Blight	<i>Xanthomonas citri</i>
Black Root Rot	<i>Berkeleyomyces basicola</i>
Boll Rot Complex	<i>Fusarium spp.</i>
	<i>Lasiodiplodia theobromae</i>
	<i>Phytophthora spp.</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Cotton Root Rot	<i>Phymatotrichopsis omnivora</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Damping Off	<i>Rhizoctonia solani</i>
Fusarium Wilt And Boll Rot	<i>Fusarium oxysporum</i>
Pythium Seedling Blight And Damping Off	<i>Pythium spp.</i>
Root-Knot Nematode	<i>Meloidogyne incognita</i>
	<i>Meloidogyne spp.</i>
Seedling Disease	<i>Fusarium equiseti</i>
	<i>Fusarium graminearum</i>
	<i>Fusarium incarnatum</i>
	<i>Fusarium solani</i>
	<i>Fusarium verticillioides</i>
	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
Target Spot	<i>Corynespora cassiicola</i>
Verticillium Wilt Complex	<i>Verticillium albo-atrum</i>
	<i>Verticillium dahliae</i>
Wet Weather Blight	<i>Boeremia exigua</i>

Cucumber

Charcoal Rot	<i>Macrophomina phaseolina</i>
Crown Blight	<i>Monosporascus cannonballus</i>
Cucumber Root Rot	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Rhizoctonia	<i>Rhizoctonia solani</i>
Sudden Wilt	<i>Erwinia tracheiphila</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Date

Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>

Edible Bean

Ascochyta Leaf And Pod Spot	<i>Ascochyta pisi</i>
Ashy Stem Blight	<i>Macrophomina phaseolina</i>
Bacterial Blight	<i>Pseudomonas syringae</i>
	<i>Xanthomonas axonopodis</i>
Bean Blight (Or Halo Blight)	<i>Pseudomonas savastanoi</i>
Root Rot	<i>Fusarium phaseoli</i>
	<i>Pythium spp.</i>
	<i>Rhizoctonia solani</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Flax

Basal Stem Blight	<i>Phoma</i> spp.
Damping-Off	<i>Alternaria</i> spp.
	<i>Fusarium</i> spp.
	<i>Pythium</i> spp.
	<i>Rhizoctonia solani</i>
Stem Rot	<i>Sclerotinia sclerotiorum</i>

Garlic

Damping-Off	<i>Pythium</i> spp.
	<i>Rhizoctonia</i> spp.
Fusarium Basal Rot	<i>Fusarium culmorum</i>
	<i>Fusarium oxysporum</i>
Sour Skin	<i>Burkholderia cepacia</i>
White Rot	<i>Stromatinia cepivora</i>

Grape

Anthracnose	<i>Elsinoe ampelina</i>
Armillaria Root Rot	<i>Armillaria mellea</i>
Black Foot Disease	<i>Dactylonectria macrodidyma</i>
	<i>Ilyonectria destructans</i>
Botryosphaeria dieback	<i>Botryosphaeria dothidea</i>
Botrytis Bunch Rot	<i>Botrytis cinerea</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Eutypa Dieback	<i>Eutypa lata</i>
	<i>Eutypa</i> spp.
Grapevine Leaf Stipe Disease	<i>Phaeoacremonium</i> spp.
Phomopsis Cane And Leafspot	<i>Diaporthe ampelina</i>
Phytophthora Crown And Root Rot	<i>Phytophthora cactorum</i>
	<i>Phytophthora cinnamomi</i>
	<i>Phytophthora cryptogea</i>
	<i>Phytophthora parasitica</i>

Pythium Root Rot	<i>Pythium</i> spp.
Verticillium Wilt	<i>Verticillium dahliae</i>

Hazelnut

Armillaria Root Rot	<i>Armillaria</i> spp.
Bacterial Canker	<i>Pseudomonas avellanae</i>
Bacterial Twig Dieback	<i>Pseudomonas syringae</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Kernel Mold	<i>Aspergillus</i> spp.
	<i>Penicillium</i> spp.
	<i>Ramularia</i> spp.
	<i>Cladosporium</i> spp.
Phytophthora Root Rot	<i>Phytophthora</i> spp.

Hemp

Bacterial Blight	<i>Pseudomonas syringae</i>
Black Dot	<i>Epicoccum nigrum</i>
Brown Blight	<i>Alternaria alternata</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Cladosporium Stem Canker	<i>Cladosporium cladosporioides</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Crown Rot Complex	<i>Pythium aphanidermatum</i>
	<i>Pythium myriotylum</i>
Damping-Off Complex	<i>Botrytis cinerea</i>
	<i>Fusarium oxysporum</i>
	<i>Fusarium solani</i>
	<i>Globisporangium debaryanum</i>
	<i>Globisporangium ultimum</i>
	<i>Rhizoctonia solani</i>
Hemp Canker	<i>Sclerotinia sclerotiorum</i>
Root-Knot Nematode	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>

Stem Canker Complex	<i>Boeremia exigua</i>
	<i>Phoma herbarum</i>
Striatura Ulcerosa	<i>Pseudomonas amygdali</i>
Verticillium Wilt Complex	<i>Verticillium albo-atrum</i>
	<i>Verticillium dahliae</i>

Hops

Armillaria Root Rot	<i>Armillaria mellea</i>
Black Root Rot	<i>Phytophthora citricola</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Fusarium Canker	<i>Fusarium oxysporum</i>
	<i>Fusarium sambucinum</i>
Sclerotinia Wilt (White Mold)	<i>Sclerotinia sclerotiorum</i>
Verticillium Wilt	<i>Verticillium albo-atrum</i>
	<i>Verticillium dahliae</i>

Lentil

Bacterial Blight	<i>Pseudomonas syringae</i>
Black Root Rot	<i>Fusarium solani</i>
Botrytis Gray Mold	<i>Botrytis cinerea</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Pythium Seed And Seedling Rot	<i>Globisporangium irregulare</i>
	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
Rhizoctonia Root Rot	<i>Rhizoctonia solani</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Lettuce

Botrytis Gray Mold	<i>Botrytis cinerea</i>
Bottom Rot	<i>Rhizoctonia solani</i>
Downy Mildew	<i>Bremia lactucae</i>
Fusarium Wilt & Root Rot	<i>Fusarium oxysporum</i>
Insv Co-Occurrence Probability	<i>Globisporangium uncinulatum</i>
Lettuce Leaf Drop	<i>Sclerotinia minor</i>
	<i>Sclerotinia sclerotiorum</i>
Phoma Leaf Spot And Basal Rot	<i>Boeremia exigua</i>
Powdery Mildew	<i>Golovinomyces cichoracearum</i>
Pythium Wilt And Leaf Blight	<i>Globisporangium megalacanthum</i>
	<i>Globisporangium spinosum</i>
	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
Varnish Spot	<i>Pseudomonas cichorii</i>
Verticillium Wilt	<i>Verticillium dahliae</i>
	<i>Verticillium isaacii</i>
	<i>Verticillium klebahnii</i>

Melon

Damping Off	<i>Pythium spp.</i>
	<i>Rhizoctonia spp.</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Melon Vine Decline	<i>Monosporascus cannonballus</i>
Phytophthora Fruit And Crown Rot	<i>Phytophthora capsici</i>
	<i>Phytophthora spp.</i>
Sudden Wilt	<i>Pythium aphanidermatum</i>

Oat

Anthracnose	<i>Colletotrichum graminicola</i>
Head Blight	<i>Bipolaris sorokiniana</i>
	<i>Fusarium graminearum</i>
	<i>Fusarium spp.</i>
Root Rot	<i>Pythium spp.</i>
Seedling Blight	<i>Rhizoctonia solani</i>

Olive

Armillaria Root Rot	<i>Armillaria spp.</i>
Phytophthora Root And Crown Rot	<i>Phytophthora spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Onion

Bacterial Soft Rot	<i>Pectobacterium carotovorum</i>
Botrytis Neck Rot	<i>Botrytis spp.</i>
Center Rot	<i>Pantoea allii</i>
	<i>Pantoea ananatis</i>
Damping-Off	<i>Fusarium spp.</i>
	<i>Pythium spp.</i>
Damping-Off And Seedling Disease	<i>Rhizoctonia spp.</i>
Enterobacter Bulb Decay	<i>Enterobacter cloacae</i>
Fusarium Basal Rot	<i>Fusarium oxysporum</i>
Phytophthora Neck And Bulb Rot	<i>Phytophthora spp.</i>
White Rot	<i>Stromatinia cepivora</i>

Pea

Alternaria Blight	<i>Alternaria alternata</i>
Anthracoese Complex	<i>Colletotrichum lentis</i>
	<i>Colletotrichum lindemuthianum</i>
	<i>Colletotrichum truncatum</i>
Bacterial Blight	<i>Pseudomonas syringae</i>
Damping-Off Complex	<i>Globisporangium debaryanum</i>
	<i>Globisporangium irregulare</i>
	<i>Globisporangium megalacanthum</i>
	<i>Globisporangium spinosum</i>
	<i>Globisporangium ultimum</i>
	<i>Globisporangium uncinulatum</i>
	<i>Rhizoctonia solani</i>
Fusarium Root Rot Complex	<i>Fusarium acuminatum</i>
	<i>Fusarium avenaceum</i>
	<i>Fusarium culmorum</i>
	<i>Fusarium equiseti</i>
	<i>Fusarium redolens</i>
	<i>Fusarium solani</i>
	<i>Fusarium sporotrichioides</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Gray Mold	<i>Botrytis cinerea</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Peach

Armillaria Root Rot	<i>Armillaria mellea</i>
	<i>Armillaria tabescens</i>
Bacterial Canker	<i>Pseudomonas syringae</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Jacket And Ripe Fruit Rot	<i>Botrytis cinerea</i>
Jacket Rot	<i>Sclerotinia sclerotiorum</i>
Peach Leaf Curl	<i>Taphrina deformans</i>
Phytophthora Root And Crown Rot	<i>Phytophthora spp.</i>

Ripe Fruit Rot	<i>Rhizopus spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Peanut

Alternaria Spot	<i>Alternaria alternata</i>
Aspergillus Crown Rot	<i>Aspergillus niger</i>
Botrytis Blight	<i>Botrytis cinerea</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Colletotrichum Leaf Spot	<i>Colletotrichum gloeosporioides</i>
Damping-Off	<i>Aspergillus flavus</i>
	<i>Fusarium spp.</i>
	<i>Pythium spp.</i>
	<i>Rhizoctonia spp.</i>
Root Rot Complex	<i>Rhizopus spp.</i>
	<i>Globisporangium debaryanum</i>
	<i>Globisporangium irregulare</i>
	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
	<i>Pythium myriotylum</i>
Root-Knot Nematode	<i>Rhizoctonia solani</i>
	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne javanica</i>
Verticillium Wilt Complex	<i>Meloidogyne spp.</i>
	<i>Verticillium albo-atrum</i>
	<i>Verticillium dahliae</i>

Pear

Alternaria Rot	<i>Alternaria alternata</i>
Blossom Blast	<i>Pseudomonas syringae</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Fire Blight	<i>Erwinia amylovora</i>
Gray Mold Rot	<i>Botrytis cinerea</i>
Mucor Rot	<i>Mucor spp.</i>
Phytophthora Rot	<i>Phytophthora spp.</i>
Verticillium Wilt	<i>Verticillium spp.</i>

Pecan

Anthracnose	<i>Colletotrichum gloeosporioides</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Phytophthora Shuck And Kernel Rot	<i>Phytophthora cactorum</i>
Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>

Pepper

Bacterial Spot	<i>Xanthomonas campestris</i>
Damping-Off	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
	<i>Pythium myriotylum</i>
	<i>Rhizoctonia solani</i>
Phytophthora Blight	<i>Phytophthora capsici</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Pistachio

Alternaria Leaf Blight	<i>Alternaria alternata</i>
Armillaria Root Rot	<i>Armillaria mellea</i>
	<i>Armillaria tabescens</i>
Blossom And Shoot Blight	<i>Botrytis cinerea</i>
Phytophthora Root And Crown Rot	<i>Phytophthora capsici</i>
	<i>Phytophthora cinnamomi</i>
	<i>Phytophthora citricola</i>
	<i>Phytophthora cryptogea</i>
	<i>Phytophthora nicotianae</i>
Sclerotinia Shoot Blight	<i>Sclerotinia sclerotiorum</i>
Seedling Blight	<i>Rhizoctonia solani</i>
	<i>Thanatephorus cucumeris</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Plum

Bacterial Canker	<i>Pseudomonas syringae</i>
Blossom Blight	<i>Sclerotinia sclerotiorum</i>
Botrytis Blossom Blight	<i>Botrytis cinerea</i>
Phytophthora Root And Crown Rot	<i>Phytophthora spp.</i>
Plum Pocket	<i>Taphrina deformans</i>
Ripe Fruit Rot	<i>Rhizopus spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Potato

Alternata Blight	<i>Alternaria alternata</i>
Black Dot	<i>Colletotrichum coccodes</i>
Black Scurf	<i>Rhizoctonia solani</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Dry Rot	<i>Fusarium avenaceum</i>
	<i>Fusarium culmorum</i>
	<i>Fusarium oxysporum</i>
	<i>Fusarium sambucinum</i>
	<i>Fusarium solani</i>
Early Blight	<i>Alternaria solani</i>
Potato Scab	<i>Streptomyces scabiei</i>
Powdery Scab	<i>Spongospora subterranea</i>
Pythium Leak	<i>Pythium spp.</i>
Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne chitwoodi</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
	<i>Meloidogyne spp.</i>
Rubbery Rot	<i>Geotrichum candidum</i>
Silver Scurf	<i>Helminthosporium solani</i>
Verticillium Wilt	<i>Verticillium dahliae</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Raspberry

Armillaria Root Rot	<i>Armillaria spp.</i>
Botrytis Fruit Rot	<i>Botrytis cinerea</i>
Phytophthora Root Rot	<i>Phytophthora spp.</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Rice

Brown Spot	<i>Bipolaris oryzae</i>
	<i>Pseudomonas coronafaciens</i>
Rice Blast	<i>Pyricularia oryzae</i>
Seed Rot	<i>Pythium</i> spp.
Sheath Rot	<i>Sarocladium oryzae</i>

Sorghum

Anthracnose	<i>Colletotrichum graminicola</i>
Bacterial Leaf Spot	<i>Pseudomonas syringae</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Damping-Off	<i>Aspergillus</i> spp.
	<i>Fusarium</i> spp.
	<i>Penicillium</i> spp.
	<i>Pythium</i> spp.
	<i>Rhizoctonia</i> spp.
Seed Rot	<i>Exserohilum</i> spp.
Seed Rot	<i>Pythium aphanidermatum</i>

Soybean

Anthracnose Stem Blight Of Soybean	<i>Colletotrichum truncatum</i>
Bacterial Blight	<i>Pseudomonas savastanoi</i>
Bacterial Pustule	<i>Xanthomonas axonopodis</i>
Cercospora Leaf Blight	<i>Cercospora kikuchii</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Diaporthe (Phomopsis) Seed Decay	<i>Diaporthe longicolla</i>
Frogeye Leaf Spot	<i>Cercospora sojae</i>
Fusarium Seed Rot	<i>Fusarium</i> spp.
Phytophthora Root And Stem Rot	<i>Phytophthora sojae</i>
Pythium Seedling Blight And Root Rot	<i>Pythium</i> spp.
Red Crown Rot	<i>Calonectria ilicicola</i>
Rhizoctonia Seedling Blight And Root Rot	<i>Rhizoctonia solani</i>

Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
	<i>Meloidogyne spp.</i>
Sclerotinia Stem Rot (White Mold)	<i>Sclerotinia sclerotiorum</i>
Southern Blight Of Soybeans	<i>Athelia rolfsii</i>
Soybean Cyst Nematode	<i>Heterodera glycines</i>
Soybean Rust	<i>Phakopsora pachyrhizi</i>
Stem Canker	<i>Diaporthe spp.</i>
Sudden Death Syndrome	<i>Fusarium virguliforme</i>
Target Spot	<i>Corynespora cassiicola</i>

Spinach

Bacterial Leaf Spot	<i>Pseudomonas syringae</i>
Damping-Off	<i>Globisporangium irregulare</i>
	<i>Globisporangium ultimum</i>
	<i>Pythium aphanidermatum</i>
Downy Mildew Or Blue Mold	<i>Peronospora effusa</i>
Fusarium Root Rot And Wilt	<i>Fusarium oxysporum</i>
Rhizoctonia Root And Crown Rot	<i>Rhizoctonia solani</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Squash

Angular Leaf Spot	<i>Pseudomonas syringae</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Phytophthora Blight	<i>Phytophthora capsici</i>
Pythium	<i>Pythium spp.</i>
Rhizoctonia	<i>Rhizoctonia spp.</i>
Sudden Wilt	<i>Pythium aphanidermatum</i>

Strawberry

Anthracnose	<i>Colletotrichum spp.</i>
Botrytis Fruit Rot	<i>Botrytis spp.</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Phytophthora Crown Rot	<i>Phytophthora cactorum</i>
	<i>Phytophthora parasitica</i>
	<i>Phytophthora spp.</i>
Red Stele	<i>Phytophthora fragariae</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Sugarbeet

Alternaria Leaf Spot	<i>Alternaria alternata</i>
Aphanomyces Damping-Off And Root Disease	<i>Aphanomyces cochlioides</i>
Aphanomyces Root Rot	<i>Aphanomyces euteiches</i>
Associated With Root Rot	<i>Leuconostoc mesenteroides</i>
	<i>Leuconostoc pseudomesenteroides</i>
Beet Cyst Nematode	<i>Heterodera schachtii</i>
Cercospora Leaf Spot	<i>Cercospora beticola</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Pythium Root Rot	<i>Globisporangium ultimum</i>
Pythium Rot	<i>Pythium aphanidermatum</i>
Rhizoctonia Damping Off And Root And Crown Rot	<i>Rhizoctonia solani</i>
Rhizomania Transmitting Fungus	<i>Polymyxa betae</i>
Root-Knot Nematode	<i>Meloidogyne chitwoodi</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
	<i>Meloidogyne spp.</i>

Sugarcane

Banded Sclerotial Leaf Disease	<i>Rhizoctonia solani</i>
Black Rot	<i>Ceratocystis adiposa</i>
Leaf Scald	<i>Xanthomonas albilineans</i>
Root Rot	<i>Pythium arrhenomanes</i>
Root-Knot Nematode	<i>Meloidogyne spp.</i>
Seedling Blight	<i>Alternaria alternata</i>

Sunflower

Apical Chlorosis	<i>Pseudomonas syringae</i>
Bacterial Stalk Rot And Head Rot	<i>Pectobacterium carotovorum</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Downy Mildew	<i>Plasmopara halstedii</i>
Fusarium Root And Stem Rot	<i>Fusarium avenaceum</i>
	<i>Fusarium graminearum</i>
	<i>Fusarium oxysporum</i>
Verticillium Wilt	<i>Verticillium dahliae</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Sweet Potato

Alternaria Stem Blight And Rot	<i>Alternaria spp.</i>
Bacterial Wilt	<i>Ralstonia solanacearum</i>
Black Rot	<i>Ceratocystis fimbriata</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Fusarium Root Rot	<i>Fusarium solani</i>
Gray Mold Rot	<i>Botrytis cinerea</i>
Hairy Roots	<i>Agrobacterium rhizogenes</i>
Punky Rot	<i>Trichoderma koningii</i>
Rhizoctonia Stem Canker	<i>Rhizoctonia solani</i>
Rhizopus Soft Rot	<i>Rhizopus stolonifer</i>
	<i>Rhizopus arrhizus</i>

Root-Knot Nematode	<i>Meloidogyne arenaria</i>
	<i>Meloidogyne hapla</i>
	<i>Meloidogyne incognita</i>
	<i>Meloidogyne javanica</i>
	<i>Meloidogyne enterolobii</i>
Streptomyces Soil Rot	<i>Streptomyces ipomoeae</i>

Tomato

Anthracnose	<i>Colletotrichum spp.</i>
Black Mold Rot	<i>Alternaria alternata</i>
Charcoal Rot	<i>Macrophomina phaseolina</i>
Damping-Off	<i>Rhizoctonia solani</i>
Damping-Off And Fruit Rot	<i>Pythium spp.</i>
Early Blight	<i>Alternaria solani</i>
Fusarium Crown And Root Rot	<i>Fusarium oxysporum</i>
Fusarium Root Rot And Wilt	<i>Fusarium solani</i>
Phytophthora Root Rot	<i>Phytophthora capsici</i>
	<i>Phytophthora nicotianae</i>
Verticillium Wilt	<i>Verticillium dahliae</i>
White Mold	<i>Sclerotinia sclerotiorum</i>

Turf

Anthracnose	<i>Colletotrichum graminicola</i>
Brown Patch	<i>Rhizoctonia solani</i>
Fusarium Blight	<i>Fusarium sambucinum</i>
	<i>Fusarium tricinctum</i>
Pythium Blight	<i>Pythium spp.</i>

Walnut

Armillaria Root Rot	<i>Armillaria mellea</i>
	<i>Armillaria tabescens</i>
Crown Gall	<i>Agrobacterium tumefaciens</i>
Hairy Turkey Tail	<i>Trametes hirsuta</i>
Phytophthora Root And Crown Rot	<i>Phytophthora cactorum</i>
	<i>Phytophthora cinnamomi</i>
	<i>Phytophthora citricola</i>
	<i>Phytophthora cryptogea</i>
	<i>Phytophthora nicotianae</i>
Sulfur Fungus	<i>Laetiporus sulphureus</i>
Turkey Tail	<i>Trametes versicolor</i>
Verticillium Wilt	<i>Verticillium dahliae</i>

Watermelon

Charcoal Rot	<i>Macrophomina phaseolina</i>
Fusarium Wilt	<i>Fusarium oxysporum</i>
Melon Vine Decline	<i>Monosporascus cannonballus</i>
Pythium Damping Off	<i>Pythium spp.</i>
Rhizoctonia Damping Off	<i>Rhizoctonia spp.</i>
Sudden Wilt	<i>Pythium aphanidermatum</i>

Wheat

Anthracnose	<i>Colletotrichum spp.</i>
Bacterial Mosaic	<i>Clavibacter michiganensis</i>
Bacterial Streak And Black Chaff	<i>Xanthomonas translucens</i>
Common Bunt (Stinking Smut)	<i>Tilletia caries</i>
	<i>Tilletia laevis</i>
Common Root Rot	<i>Bipolaris sorokiniana</i>
Fusarium Head Blight	<i>Fusarium spp.</i>
Fusarium Rot And Seedling Blight	<i>Fusarium acuminatum</i>
	<i>Fusarium avenaceum</i>
	<i>Fusarium cerealis</i>
	<i>Fusarium culmorum</i>
	<i>Fusarium graminearum</i>
	<i>Fusarium poae</i>
<i>Fusarium pseudograminearum</i>	
Gray Leaf Spot	<i>Pyricularia grisea</i>
Pythium Root Rot	<i>Pythium spp.</i>
Rhizoctonia Root Rot	<i>Rhizoctonia spp.</i>
Septoria Tritici Blotch	<i>Zymoseptoria tritici</i>
Take-All	<i>Gaeumannomyces tritici</i>

Appendix A: How Trace Genomics detects pests from soil

Trace analyzes soil biology using metagenomics, which is a DNA sequencing technique that accounts for all genetic material in a sample rather than using a target gene. From the sequenced DNA, the Trace analytics engine uses a classification system to find matches in our genome database and identify the organisms (both pathogenic and beneficial) that are present. This method provides the most accurate comprehensive diagnostic results while also being the most scalable. For a more in-depth comparison of metagenomics to other diagnostic technologies, see blog posts on the Trace website (1, 2).

The output from the classifier is a quantitative list of scientific names of the organisms found to be present in the soil sample. From this list, Latin names are translated into actionable insights using a reference file that corresponds the identified pests with common names and host crops. If a pest is able to be identified by Trace and is listed under one crop host, it has the potential to be reported under other hosts as well.

If a pest of interest is not present in our database or not associated with a crop of interest, users can request it be added by emailing support@tracegenomics.com.

Appendix B: Finding your pest data in TraceVIEW

A complete pest profile of your soil sample can be found within TraceVIEW under the Analytics or Maps tab. In order to provide context for the quantification of each pest, benchmarks classify pest levels as high, medium, or low. Benchmarks are calculated using soil samples that originated from a similar environment and grew the same crop. In order for benchmarks to be provided, Trace requires a minimum number of samples from the host crop. Please note that, since different crops will have different benchmarks, users should make sure they have the correct crop selected when viewing a specific pest.

Select Indicator Type

Nutrient Cycling | **Pathogen** | Chemistry

Crop for Indicator List: Soybean

Filter Samples (optional) Clear all filters

Sampling Date Start: mm/dd/yyyy | Sampling Date End: mm/dd/yyyy | Farm: Select Farm | Field: Select Field | Planted Crop: Select Planted Crop

Sample Tags: Select Sample Tags

View Indicator

- Anthracnose (Colletotrichum graminicola)
- Charcoal Rot (Macrophomina phaseolina)
- Damping-Off (Pythium spp.)**
- Fusarium Seed Rot (Fusarium graminearum)
- Phytophthora Root and Stem Rot (Phytophthora sojae)
- Pod and Stem Blight (Diaporthe)
- Root and Stem Rot (Rhizoctonia spp.)

Damping-Off

Crop: Soybean
Grouping: Field
Benchmark: 3.72 PPB Soil

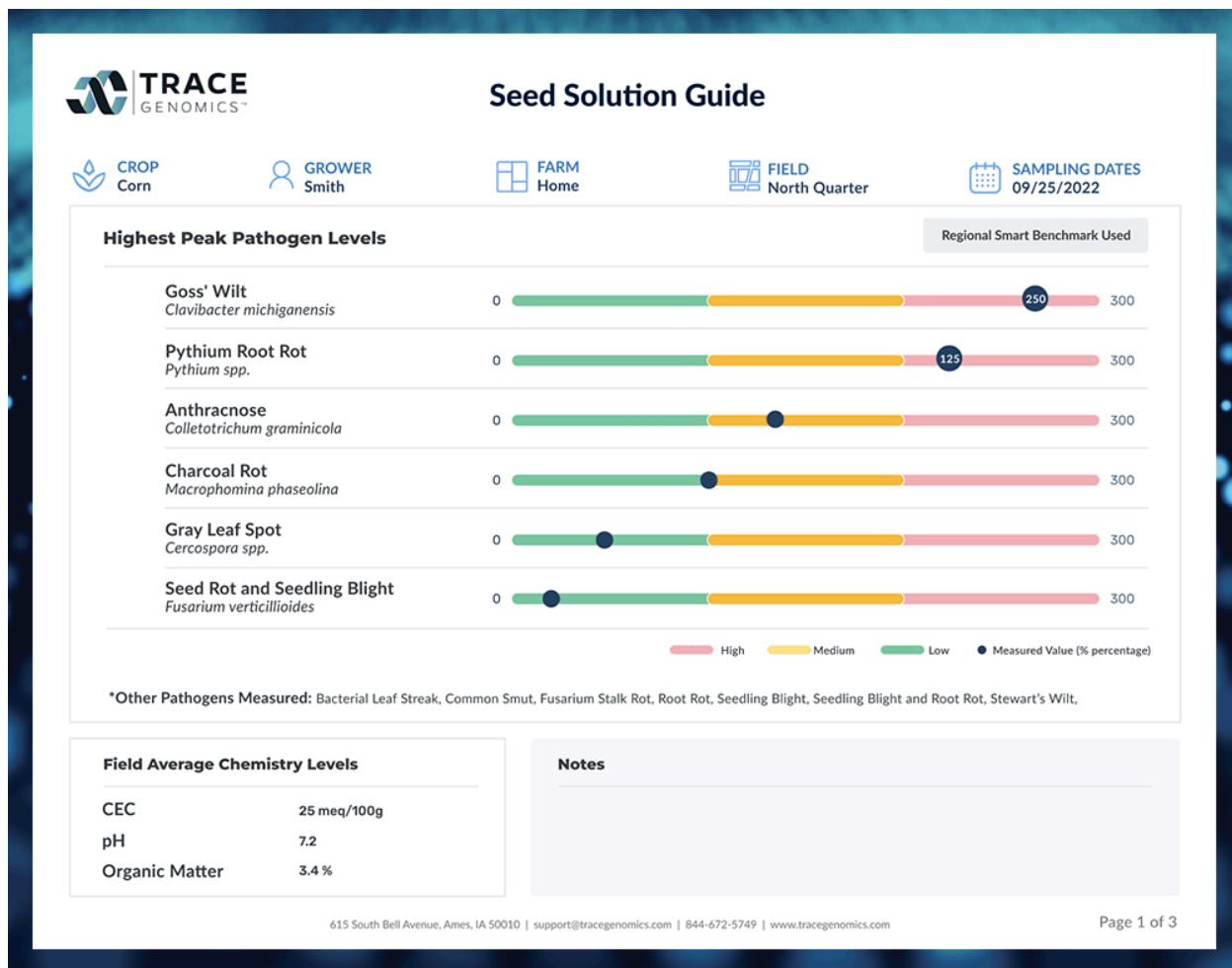
Pythium spp. causes Damping-Off in Soybean.

Damping-Off PPB Soil

Field	Damping-Off PPB Soil
Josie Main	4.5
East of Olga's Drive	3.5
East Of David Drive	3.2
West Dad's Drive	3.1
Pasture Field	3.0
West of Olga's Drive	2.8
Marine Northwest 80	2.6
East of Dad's Drive	2.5
Josie Little	2.4
South of Creek	2.3
Bert Main	2.2
North of Olga's Woods	2.1
Serr West 40	2.0
Orville North	1.8
North Of Creek	1.6
Marine Big	1.5
Berg Main	1.4
Serr NE 40	1.2

Group Samples By: Field | Sort by: Value (Desc)

Pest data is also provided in our downloadable Seed Solution Guide. This report shows the quantified pests benchmarked by crop, and can be used by agronomists to select seeds, seed treatments, and make in-season management decisions.



If a pest of interest is not listed under its associated crop on TraceVIEW, it may be found by selecting Crop for Indicator List: "Other". For pests reported as complexes, if users are curious which agent in the complex was detected, it can be found in this manner.

To request a new pest be added or an existing pest be reported under an additional crop, please email support@tracegenomics.com.