

Disease implications of rotation crops following sunflower

	Alternaria blight (<i>Alternaria helianthi</i>)	Phomopsis stem canker (<i>Diaporthe/Phomopsis</i> species*)	Powdery mildew (<i>Golovinomyces cichoracearum</i>)	Rhizopus head rot (<i>Rhizopus</i> species)	Sunflower rust (<i>Puccinia helianthi</i>)	Sclerotinia base, stem and head rot (<i>Sclerotinia minor</i> & <i>S. sclerotiorum</i>)	Sclerotium base rot (<i>Sclerotium rolfsii</i>)	Tobacco streak virus (TSV**)
Spread	Airborne spores, infected residues.	Infected residues, infected Seed	Airborne spores	Airborne spores	Airborne spores	Sclerote-infected host residues, soil and seed.	Sclerote-infected host residues and soil.	Transmitted by thrips in pollen of infected weed hosts, seedborne in parthenium weed.
Survival	Infected sunflower residues, living sunflower volunteers & wild sunflowers.	Seed, infected sunflower and other host residues, living volunteer & weed hosts.	Needs a live plant for survival such as sunflower volunteers, wild sunflowers, some other Asteraceae.	Residues of many plants - opportunistic coloniser of damaged tissue.	Live sunflower volunteers & wild sunflowers. Telia stage can survive on crop residues.	Survival in infected host residues, soil, and live broadleaf crop and weed hosts.	Survival in infected host residues, soil, and live crop and weed hosts.	Live volunteer and weed hosts, particularly parthenium weed.
Barley	Non-host	Non-host*	Non-host	Non-host	Non-host	Non-host	Minor host. Be aware of disease levels in previous crops.	Non-host. Control parthenium weed, maintain farm hygiene.
Canola	Non-host	Non-host*	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Non-host. Control parthenium weed, maintain farm hygiene.
Chickpea	Non-host	Possible host of some <i>Diaporthe</i> species under favourable conditions. Be aware of disease levels in previous crops.	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Minor host. Be aware of disease levels in previous crops.	Minor host. Control parthenium, maintain farm hygiene.
Cotton	Non-host	Non-host*	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Minor host. Control parthenium, maintain farm hygiene.
Faba bean	Non-host	Possible host of some <i>Diaporthe</i> species under favourable conditions. Be aware of disease levels in previous crops.	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Minor host. Control parthenium, maintain farm hygiene.
Long fallow	Incorporate infected residues early.	Incorporate infected residues early.	Control sunflower volunteers, wild sunflowers and other hosts.	<i>Rhizopus</i> species are common in nature. Be aware of disease levels in previous crops.	Control sunflower volunteers & wild sunflower plants. Incorporate infected residues.	Incorporate infected residues, maintain farm hygiene, control hosts.	Incorporate infected residues, maintain farm hygiene, control hosts.	Control parthenium, maintain farm hygiene.
Maize	Non-host	Non-host*	Non-host	Non-host	Non-host	Non-host	Minor host. Be aware of disease levels in previous crops.	Non-host. Control parthenium weed, maintain farm hygiene.
Mungbean	Non-host	Possible host of some <i>Diaporthe</i> species under favourable conditions. Be aware of disease levels in previous crops.	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Seasonal effect highly variable: very susceptible, maintain farm hygiene, avoid planting downwind of major parthenium infestations
Oats	Non-host	Non-host*	Non-host	Non-host	Non-host	Non-host	Minor host. Be aware of disease levels in previous crops.	Non-host. Control parthenium weed, maintain farm hygiene.
Peanuts	Non-host	Non-host*	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Minor host. Control parthenium, maintain farm hygiene.
Pigeon pea	Non-host	Non-host*	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Minor host. Control parthenium, maintain farm hygiene.
Safflower	Non-host	Possible host of some <i>Diaporthe</i> species under favourable conditions. Be aware of disease levels in previous crops.	Possible host under favourable conditions. Airborne spores travel long distances.	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Minor host. Control parthenium, maintain farm hygiene.
Sorghum	Non-host	Non-host*	Non-host	Non-host	Non-host	Non-host	Minor host. Be aware of disease levels in previous crops.	Non-host. Control parthenium weed, maintain farm hygiene.
Soybean	Non-host	Possible host of some <i>Diaporthe</i> species under favourable conditions. Be aware of disease levels in previous crops.	Non-host	Non-host	Non-host	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Minor host. Control parthenium, maintain farm hygiene.
Sunflower (back to back)	Incorporate infected residues, control sunflower volunteers, rotate with other crops.	Incorporate infected residues, control weeds and volunteers, rotate with non-host crops.	Host. Does not survive on stubble. Control volunteers and other living hosts. Fungicide available.	Control insects to minimise damage to heads.	Control sunflower volunteers & wild sunflower plants. Incorporate infected residues. Plant rust resistant hybrids.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with summer/winter cereal crops.	Incorporate infected residues, maintain farm hygiene, control hosts, rotate with non-host crops.	Plant tolerant varieties, maintain farm hygiene, avoid planting downwind of major parthenium infestations
Wheat	Non-host	Non-host*	Non-host	Non-host	Non-host	Non-host	Minor host. Be aware of disease levels in previous crops.	Non-host. Control parthenium weed, maintain farm hygiene.

Low risk Caution High risk

* Note: *Diaporthe/Phomopsis* species - although many crops are listed as non-hosts, *Diaporthe/Phomopsis* spp. have a saprophytic and/or endophytic phase and may be capable of infecting live plants or stubble of most plants (including so called non-hosts)

**Note: TSV is currently recorded on some field crops only in Central Queensland, and is associated with specific weed hosts.

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Disease risk for different crops following outbreaks of some significant soilborne and/or stubbleborne pathogens of the northern region

	Root lesion nematode (<i>Pratylenchus thornei</i>)	Root lesion nematode (<i>Pratylenchus neglectus</i>)	Fusarium head blight (<i>Fusarium graminearum</i> *)	Fusarium stalk rot and cob rot (<i>Fusarium verticillioides</i> *)	Fusarium wilt (<i>Fusarium oxysporum</i> f.sp. <i>vasinfectum</i> *)	Ascochyta Blight (<i>Phoma rabiei</i> also known as <i>Ascochyta rabiei</i>)	Verticillium Wilt (<i>Verticillium</i> spp.)	Fusarium stalk rot and head blight (<i>Fusarium</i> spp., mostly <i>F. thapsinum</i> and <i>F. andiyazi</i> *)	Fusarium crown rot (<i>Fusarium</i> spp., mostly <i>F. pseudograminearum</i> *)	Charcoal rot (<i>Macrophomina phaseolina</i> **)	Blackleg of Canola (<i>Leptosphaeria maculans</i>)
Spread	From infested soil and in flood water	From infested soil and in flood water	Airborne spores, infected stubble, seed	Airborne spores, infected stubble, seed	Infected soil and plant residues	Watersplashed spores, infected stubble, seed	Sclerote-infested soil, infected stubble	Airborne spores, infected stubble, seed	Airborne spores, infected stubble, soil	Infected stubble, soil	Airborne spores, infected stubble
Survival	Eggs, juveniles and adult stages in soil and root pieces	Eggs, juveniles and adult stages in soil and root pieces	Infected stubble, seed, alternative hosts, host volunteers	Infected stubble, seed, alternative hosts, host volunteers	Soil and residues	Infected stubble, seed, host volunteers; no alternative hosts	Survives in infected stubble, soil, volunteers, weed hosts	Infected stubble, seed, alternative hosts, host volunteers	Infected stubble, seed, soil, alternative hosts, host volunteers	Infected stubble, soil, wide range of live crop & weed host plants	Infected stubble, host volunteers
Barley	Moderately susceptible to moderately resistant	Moderately susceptible to moderately resistant	Susceptible	Non-host*	Non-host*	Non-host	Non-host	Non-host*	Susceptible	Non-host**	Non-host
Canola	Resistant	Susceptible	Non-host*	Non-host*	Untested	Non-host	Non-host	Non-host*	Non-host*	Non-host**	Varieties differ in resistance
Chickpea	Susceptible	Susceptible	Non-host*	Non-host*	Non-host*	Varieties differ in resistance	Non-host	Non-host*	Non-host*	Non-host**	Non-host
Cotton	Resistant	Resistant	Non-host*	Non-host*	Varieties differ in resistance (F rank)	Non-host	Risk is related to variety V rank. Incorporate residues.	Non-host*	Non-host*	Minor host, mostly dryland crops	Non-host
Faba bean	Susceptible	Resistant	Non-host*	Non-host*	Non-host*	Non-host	Non-host	Non-host*	Non-host*	Non-host**	Non-host
Long fallow	Eggs, juveniles and adult stages in soil and root pieces	Eggs, juveniles and adult stages in soil and root pieces	Survives in infected stubble, weed hosts	Survives in infected stubble, weed hosts	Survives in infected stubble, soil, volunteers, weed hosts	Survives in infected stubble, volunteers	Survives in infected stubble, soil, volunteers, weed hosts	Survives in infected stubble, volunteers, weed hosts	Survives in infected stubble, soil, grass weed hosts	Survives in infected stubble, soil and weed hosts	Survives in infected stubble, volunteers
Maize	Susceptible to moderately resistant	Resistant	Causes stalk rot and cob rot	Causes stalk rot and cob rot	Non-host*	Non-host	Non-host	Non-host*	Non-host*	Susceptible	Non-host
Mungbean	Susceptible	Resistant	Non-host*	Non-host*	Non-host*	Non-host	Non-host	Non-host*	Non-host*	Susceptible	Non-host
Oats	Untested	Untested	Recorded as susceptible overseas	Non-host*	Non-host*	Non-host	Non-host	Non-host*	Susceptible	Non-host**	Non-host
Peanuts	Untested	Untested	Non-host*	Non-host*	Non-host*	Non-host	Susceptible	Non-host*	Non-host*	Minor host	Non-host
Pigeon pea	Resistant	Untested	Non-host*	Non-host*	Untested	Non-host	Non-host	Non-host*	Non-host*	Minor host	Non-host
Safflower	Untested	Untested	Non-host*	Non-host*	Untested	Non-host	Susceptible	Non-host*	Non-host*	Minor host	Non-host
Sorghum	Resistant	Susceptible	Possible infection in wet years	Found occasionally in infected stalks	Non-host*	Non-host	Non-host	Susceptible	Recorded in stubble	Susceptible	Non-host
Soybean	Susceptible	Resistant	Non-host*	Non-host*	Non-host*	Non-host	Susceptible	Non-host*	Non-host*	Susceptible	Non-host
Sunflower	Resistant	Resistant	Non-host*	Non-host*	Non-host*	Non-host	Varieties vary in tolerance	Non-host*	Non-host*	Susceptible	Non-host
Wheat	Susceptible to moderately resistant	Susceptible to moderately resistant	Susceptible	Non-host*	Non-host*	Non-host	Non-host	Non-host*	Susceptible, can cause head blight	Non-host**	Non-host

Low risk Caution High risk

*Note: *Fusarium* species - although many crops are listed as non-hosts, many *Fusarium* spp. have a saprophytic and/or endophytic phase and may be capable of infecting live plants or stubble of most plants (including so called non-hosts)

** Note: *Macrophomina phaseolina* is found in most soils and is capable of colonising the roots of many crop and weed plants without aboveground symptoms being displayed

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