



Nurturing Crops,
Protecting Crops

The role of soil DNA testing in managing the risk of soilborne diseases

An Introduction by Doris Blaesing, RMCG

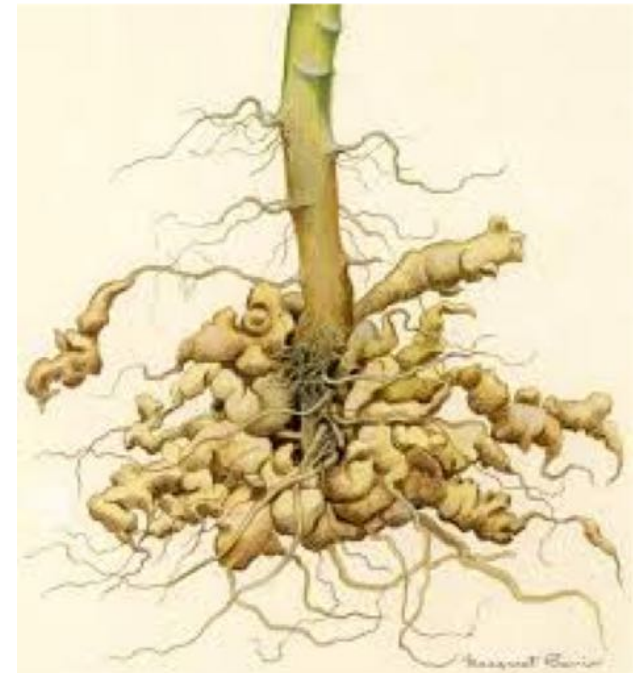


Major soilborne diseases - brassicas

e.g. cauliflower, cabbage, broccoli, Asian greens

- **Clubroot** (*Plasmodiophora brassicae*)
- **Sclerotinia** (*S. sclerotiorum*)
- **Damping off complex** (*Rhizoctonia* spp, *Pythium* spp., *Fusarium* spp.)

Many biofumigation crops belong to the brassica family





Major soilborne diseases - carrots

- **Cavity spot and forking** (*Pythium sulcatum*, *P. violae*)
- **Root-knot nematodes** (*Meloidogyne* spp.)
- **Carrot Scab (Tas)** (*Streptomyces scabies*)
- **Damping off complex (Qld)** (*Rhizoctonia* spp., *Pythium* spp.)





Major soilborne diseases – leafy veg

Babyleaf spinach

- **Damping off complex** (*Rhizoctonia* spp, *Pythium* spp., *Fusarium* spp.)



Lettuce

- **Damping off complex** (*Rhizoctonia* spp, *Pythium* spp., *Fusarium* spp.)
- **Sclerotinia** (*S. sclerotiorum*, *S. minor*)
- **Big Vein** (lettuce big-vein associated virus via *Ospidium brassicae*, Mirafiori lettuce virus)

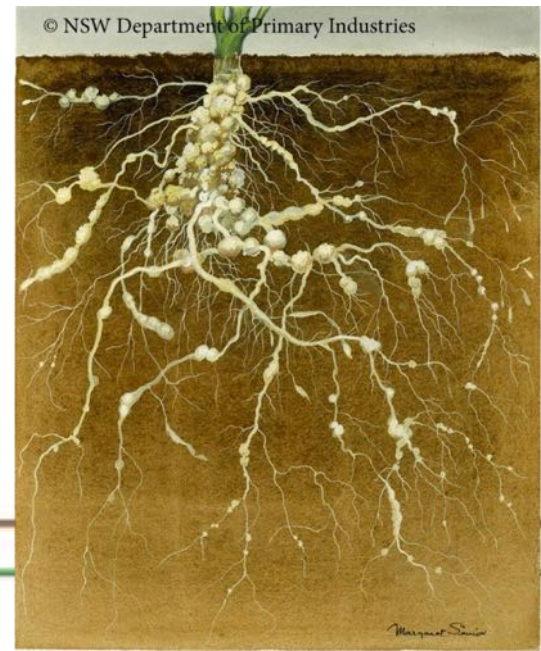
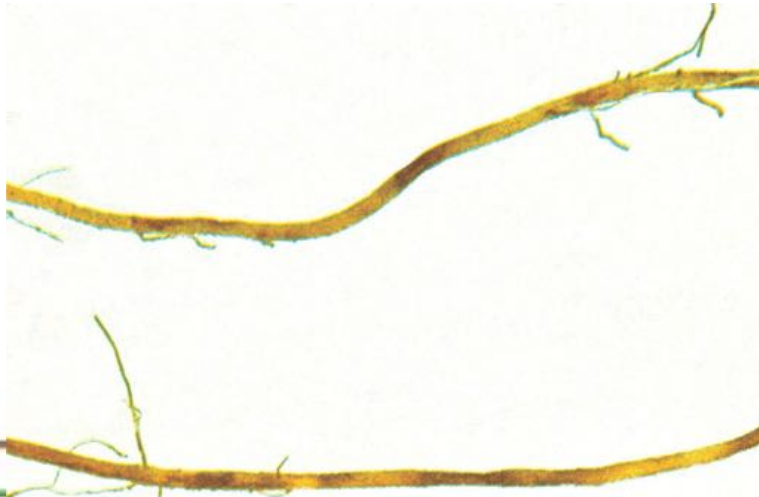




Major soilborne diseases - capsicums

and chillies

- **Southern blight (Qld)** (*Sclerotium rolfsii*)
- **Root lesion and root-knot nematodes** (*Meloidogyne* spp., *Pratylenchus* spp.)
- **Damping off complex** (*Rhizoctonia* spp, *Pythium* spp., *Fusarium* spp., *Phytophthora* spp.)





Major soilborne diseases - beans

- **Sclerotinia** (*S. sclerotiorum*)
- **Damping off** (*Rhizoctonia spp.*)
- **Southern blight** (Qld) (*Sclerotium rolfsii*)
- **Charcoal rot** (*Macrophomina phaseolina*)





Major soilborne diseases - leeks

- **Basal plate rot** (*Fusarium* spp.)
- **Pink root** (*Pyrenochaeta terrestris*)



Prevention

- **Site selection** - knowledge of paddock conditions and (disease) history
- **Tolerant or resistant varieties**
- **Rotation** with non-hosts, controlling weeds
- **Soil health management** - biological diversity, soil structure (= no compaction good drainage)
- **Fast crop establishment** – optimum planting times and conditions transplant quality, good early root growth
- **Clean seed and transplants** - seed testing & dressing, nursery hygiene, transplant dips



Managing the risk



- **Balanced nutrition** - avoiding excess nitrogen
- **No stress**
- **Microclimate manipulation** – irrigation, row direction, plant spacing, canopy type)
- **Hygiene and sanitation** - no soil, water and equipment movement from infested to clean sites, clean water
- **Optimising pesticide programs** - types, application methods and timing, pesticide resistance management
- **Fumigation** – e.g. for high value crops e.g. seed (last resort)



Understanding the risk

- Crop histories, monitoring of diseases in previous crops to guide site selection and crop choices
- Observing surrounding host crops and eliminating weed hosts (area wide management)
- Weather monitoring and disease forecasting to help with managing risks identified by e.g. soil and seed tests and to target pesticide applications
- Pre-plant soil tests, seed tests

