

Clubroot Disease Life Cycle

Plasmodiophora brassicae

1 Resting Spores

Oct-May

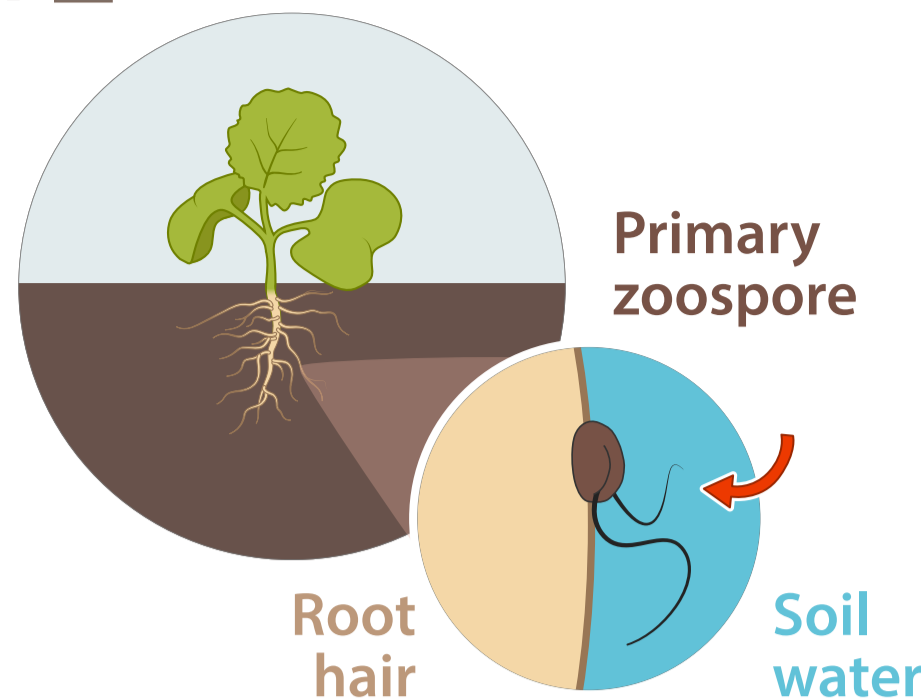
Plasmodiophora brassicae overwinters in soil as a hardy **resting spore**. The spores are so small that billions can fit into **one gram of soil** (about 1 teaspoon).

A two-year break from host plants provides **up to 90% reduction** in resting spores.

2 Primary Infection

May-June

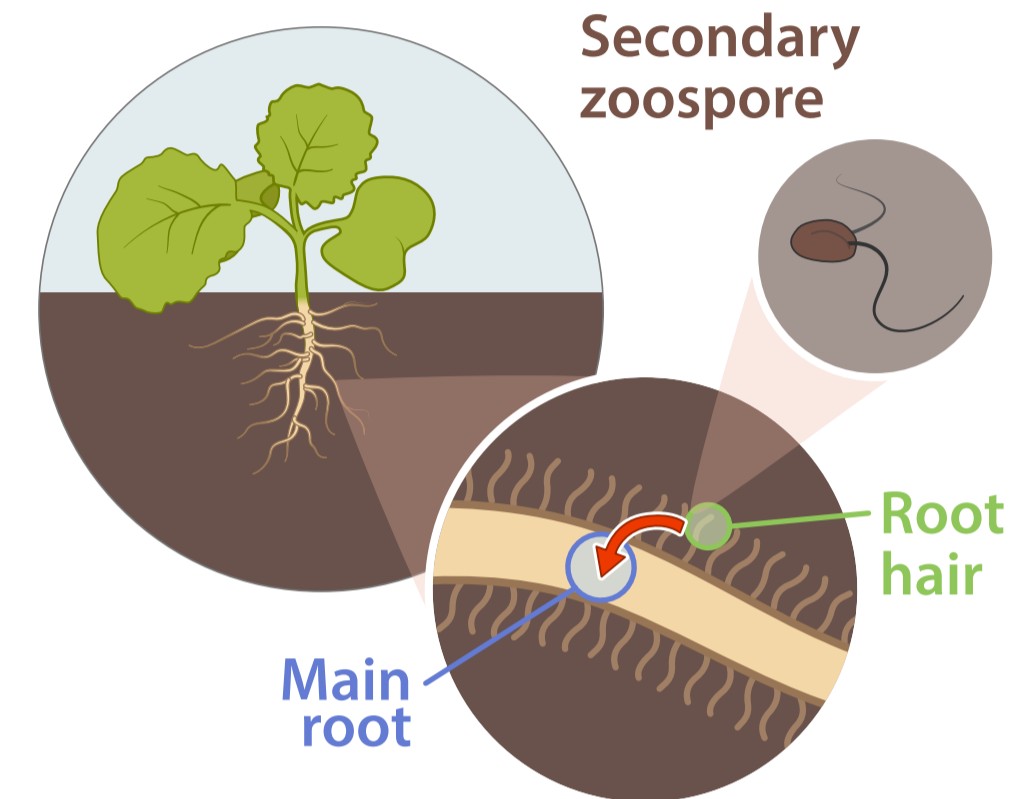
When soil is warm and moist, resting spores germinate into **zoospores**, which seek out and penetrate root hairs.



3 Secondary Infection

May-July

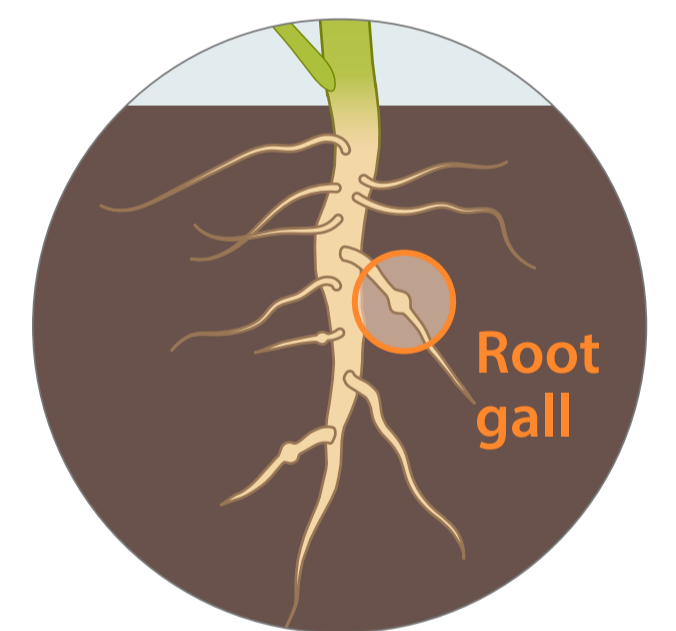
In root hairs, the pathogen develops into more zoospores. These **secondary zoospores** are released and infect the main root.



4 Galls Form

June-Sept

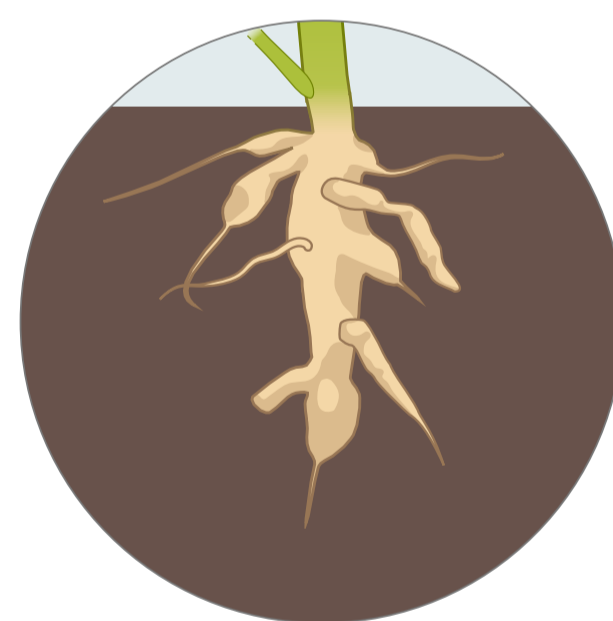
The pathogen stimulates cell division and growth, leading to the **development of galls** (clubbed roots).



5 Galls Grow In Size

June-Sept

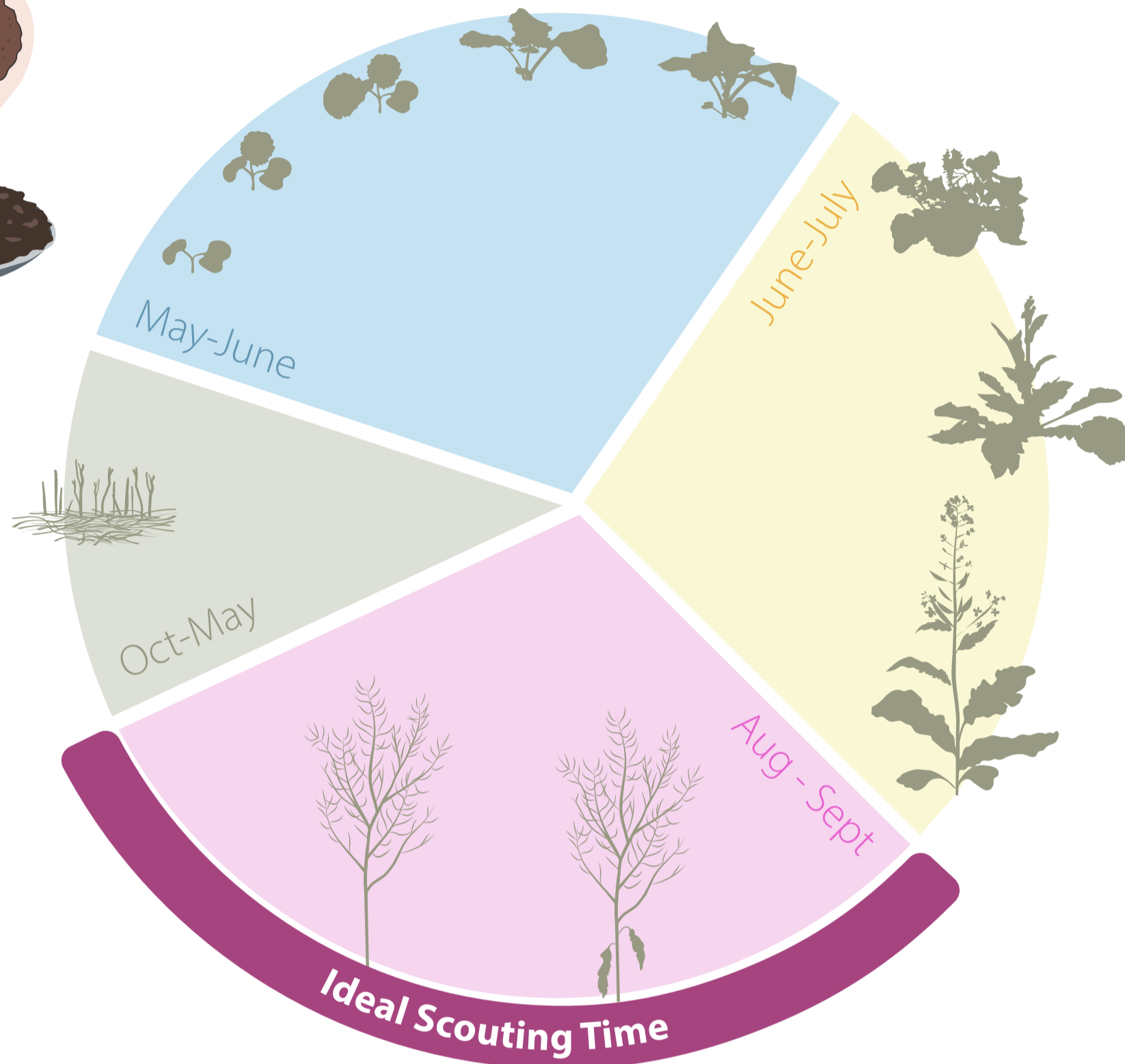
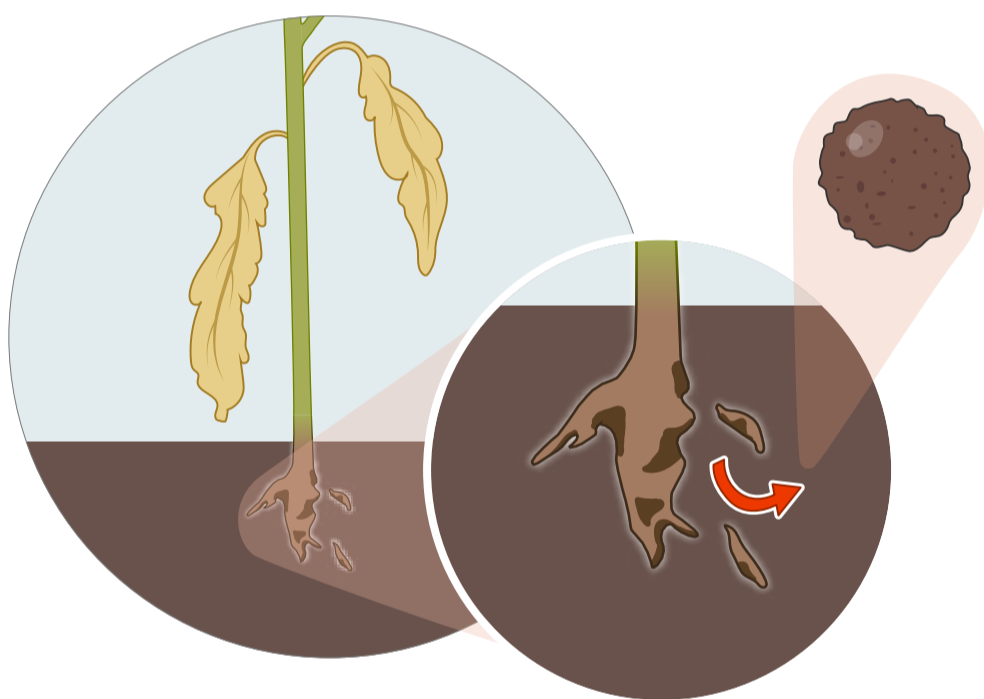
As galls grow, **water and nutrients** are increasingly restricted to the aboveground parts of the plant.



6 Plant Senescence/ Gall Decomposition

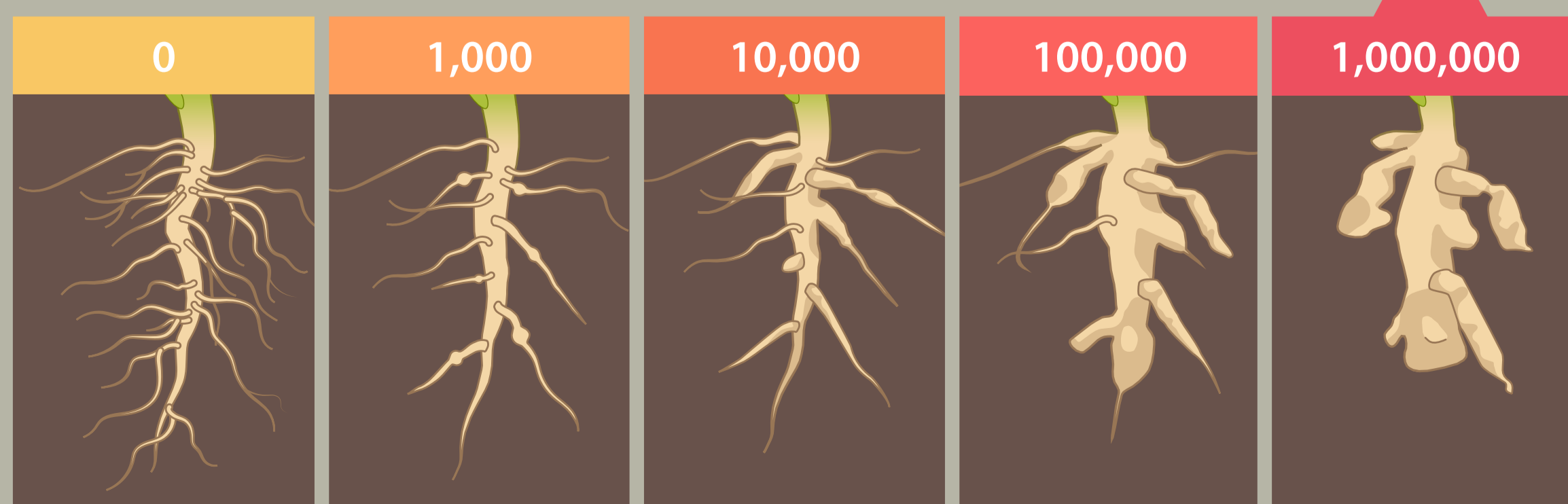
July-Nov

Severely infected plants will **wilt and die prematurely**. As galls decompose, new **resting spores** are released back into the soil.



Number of spores in one gram of soil (about one teaspoon)

As **spore concentration** in soil increases, so does **clubroot risk**.



Scouting



Scout canola fields and brassica weeds for clubroot, every year. Focus on higher moisture and/or higher traffic areas.