

***Synchytrium endobioticum* (Potato Wart or Potato Canker)**

Hosts: *Synchytrium endobioticum* is an obligate parasite of certain members of the order *Solanaceae* with potato (*Solanum tuberosum*) being the only cultivated host. In Mexico some wild *Solanum* species are also known as hosts.

Distribution: **Asia:** Armenia, Bhutan, China (unconfirmed), India, Iran (unconfirmed), Korean peninsula (unconfirmed), Lebanon (unconfirmed), Nepal; **Africa:** Algeria, Egypt (unconfirmed), South Africa, Tunisia, Zimbabwe (unconfirmed); **Europe:** All countries, except Portugal where it was eradicated (unconfirmed); **North America:** Canada (NFLD, PEI), USA (Pennsylvania, West Virginia, Maryland - all declared eradicated), Mexico (unconfirmed); **Pacific:** New Zealand's South Island; **South America:** Bolivia, Chile, Falkland Is., Peru, Uruguay.

Biology: *S. endobioticum* is a soil borne fungal parasite which does not produce hyphae, but sporangia containing anywhere from 200-300 motile zoospores. In the spring, at temperatures above 8°C and given sufficient moisture, the overwintering sporangium found in decaying warts in the soil germinate and release uninucleate zoospores. The zoospores possess a single flagellum (tail) which enables them to move in soil water to reach the host. Once a suitable host cell is encountered, the zoospore will shed its tail and penetrate the cell. The infected cell swells as the enclosed fungus forms a short-lived but quickly reproducing structure, the summer sporangium, from which numerous zoospores are released to infect neighbouring cells. This cycle of infection and release may be repeated for as long as conditions are suitable, resulting in the host tissue becoming thoroughly infected. The cells surrounding the infected ones also swell and the tissue proliferates, producing the characteristic cauliflower-like appearance (**Figure 1.**).

Under certain conditions of stress, such as water shortage, the zoospores may fuse in pairs to form zygotes. In this case, the host cell wall remains closely attached, forming an outer layer to the resistant, thick-walled structure called the winter sporangium. Mature winter sporangia are released into the soil from rotting warts. They can remain viable for up to 30 years and can be found at depths of up to 50 cm. The disease can be spread by infected seed tubers which may have incipient warts, or in infested soil attached to tubers. The sporangia can survive digestion by animals, and therefore can be spread by fecal material.

Detection and Identification

Symptoms: The disease appears on all underground parts except the roots. Buds on stems, stolons, and tubers are the centres of infection and abnormal growth activity leading to wart formation. Above ground symptoms are not usually apparent although there may be a reduction in plant vigour.

Identification: The warts vary from very small protuberances to large intricately branched systems (**Figure 2.**). A typical wart is initially white in colour, roughly spherical, but it is usually not a solid structure. It is soft and pulpy and can be cut more easily than a tuber. Morphologically it consists of distorted, proliferated branches and leaves grown together into a mass of hyperplastic tissue resembling the head of a cauliflower. Often a developing wart may become exposed at or above the soil line, in which case it will turn green. As the warts become older, whether above or below ground, they darken and decay. It is not uncommon for the entire tuber to be replaced by the warty proliferation. Warts which develop on potatoes in storage may be the same colour as the tuber.

Management: This disease is controlled through quarantine (exclusion) measures. Only plant commercially produced certified seed potatoes that are free of potato wart. Proper disinfection of tools and machinery is important in managing all potato diseases. Contact the CFIA if you see any symptoms on your potatoes.

Figure 1



Figure 2



Text: Plant Health Surveillance Unit, CFIA.

Photo: Figure 1. Agriculture & Agri-Food Canada, Research Branch, Atlantic Cool Climate Crop Research Centre, St. John's, NFLD. Figure 2. USDA-APHIS-PPQ.

Source: Adopted by Dr. Khalil Al-Mughrabi from the Canadian Food Inspection Agency (CFIA) website:

<https://inspection.canada.ca/plant-health/invasive-species/plant-diseases/potato-wart-or-potato-canker/eng/1327933703431/1327933793006>