

Abstract

The main and most efficient measure to control potato cyst nematode (PCN) is the use of resistant cultivars. German and Dutch National Plant Protection Organizations (NPPOs) recently reported the emergence of *Globodera pallida* populations virulent on potato cultivars carrying resistance against pathotype 2/3. The development and virulence of the virulent population Oberlangen from Germany in comparison to the reference population *G. pallida* Pa3 Chavornay were investigated on resistant and susceptible cultivars in glasshouse experiments. Various life history traits associated with change in virulence were also assessed. Hatching of second-stage juveniles (J2s) was similar for both populations but incubation of cysts in potato root diffusate resulted in higher hatching rates compared to 3 mM Zinc Chloride and tap water. Both populations showed high penetration rates in the roots of the resistant and susceptible cultivars. However, only the population Oberlangen was able to complete the life cycle in the roots of the resistant potato cultivar. In 'Seresta', the resistance response restricted the formation of females by avirulent individuals in favor of males. Oberlangen was virulent on all cultivars tested. No difference in cyst size, number of eggs per cyst, length of juveniles, and males was found for Oberlangen and Chavornay on the susceptible cv. 'Desiree'. However, cysts of virulent populations from the same region Oberlangen was obtained from had a significantly larger diameter compared to avirulent populations. The population Oberlangen showed a higher reproduction and fitness than the reference population Chavornay on susceptible cultivars and could serve as a future reference population in testing of new potato cultivars for resistance against this new virulence type in Europe.