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## Novel Approaches to Clubroot Management in Western Canada

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Over the past decade, clubroot has emerged as a major constraint to canola (*Brassica napus*) production in central Alberta, Canada. The number of fields with confirmed *P. brassicae* infestations in Alberta has increased steadily from 12 in 2003 to nearly 2,000 in 2014. Management of clubroot on canola has focused on sanitization of field equipment, soil amendments to reduce viable pathogen populations, long rotations out of susceptible crops and cropping of resistant cultivars. Clubroot resistance is the most effective and economical method of disease mitigation, but the recent identification of isolated *P. brassicae* populations with novel virulence phenotypes capable of overcoming resistance in most canola cultivars highlights the variable nature and adaptability of the pathogen. Recent studies have shown slight reductions in pathogen populations through crop rotations, but much more substantial reductions in spore populations in heavily infested areas near field entrances using fumigants such as Vapam (metam-sodium) or Basamid (dazomet). Greenhouse trials showed that seedling emergence, plant height and root weight increased, while primary and secondary infection and disease severity decreased with increased Basamid dosage. However, field trials showed some phytotoxicity. Application of Vapam at rates of 0.4 to 1.6 mL L<sup>-1</sup> soil resulted in 12-16 fold reductions in clubroot severity and primary and secondary infection. Vapam also was effective in reducing clubroot severity and improving canola seed yield under field conditions. These studies underscore the need for good resistance stewardship and for the integration of multiple products and practices for successful management of clubroot on canola.