New Parasitoid Continues to Suppress Imported Cabbageworm all Summer

Roy Van Driesche
PSIS/Entomology Division, University of Massachusetts

History of project. Cole crop growers in MA traditionally have had to control imported cabbageworm (*Pieris rapae*) in their broccoli, Brussels sprouts, and cabbage. In 1988, I imported and released a potentially more effective and safer parasitoid of this pest from China. This braconid wasp (*Cotesia rubecula*) established and spread and in spring of 2007, I measured its presence in organic, conventional and home garden cole crops in MA and found that *C. rubecula* was present at all 20 sites in the survey, with high levels of parasitism (75%, averaged over all 20 sites). Because this parasitoid kills caterpillars when they are less than 1/3 grown (4^{th} instar larvae), over 70% of the damage that might be done by a healthy caterpillar is prevented. In the 2007 survey, only 10% of the larvae encountered had reached the highly damaging mature stage (5^{th} instars) that does most of the feeding. Additionally in the 2007 survey, I found that the once common parasitoid, *Cotesia glomerata* had been largely replaced in the spring by the newer, more effective species, *C. rubecula*. Over 99% of all *P. rapae* parasitoids recovered in the spring 2007 survey were *C. rubecula*.

New data. The 2007 surveys were all done in May and June, during the first generation of *P. rapae* caterpillars. The question remained whether the high level of parasitism seen in spring would hold up over the summer. Also, it was also possible that the originally introduced parasitoid, *C. glomerata*, would become more common later in the year. To answer these questions, in 2009 I repeated the survey done in 2007, visiting 19 sites in MA, one in Burlington, VT and one in Charleston, RI. Based on the collection of 719 *P. rapae* larvae (or pupae or parasitoid cocoons), I found that parasitism of *P. rapae* in late summer (September-October) of 2009 again 75%, the same as in the spring of 2007. Also, I found that while *C. glomerata* increased somewhat in relation to *C. rubecula* (being 12% of all parasitoids collected), *C. rubecula* remained the dominant parasitoid, accounting for 88% of all parasitism. It was also present at all 21 of the sites surveyed.

Conclusions. This new information shows that the classical biological control project against imported cabbageworm started back in 1988 at UMASS has been successful and that the new parasitoid is now providing a high and consistent level of mortality, making production of organic or low-spray cole crops in MA easier. Reports of this same parasitoid have been obtained from neighboring states, with 91% parasitism (about 2/3 due to *C. rubecula*) from a site in RI and 67% (all due to *C. rubecula*) in Burlington, VT. *Cotesia rubecula* has also been recovered near Ithaca, New York. How far from MA this new parasitoid has spread is unknown, but appears to be spreading quite far and should affect control of this pest in many states in the northeastern US quite soon.