



Best management practices promote the control and suppression of the squash bug early in their life cycle, when the nymphs are first found. One egg cluster per plant has been identified as the treatment threshold, however it is important to note that eggs are impervious to insecticides.

Squash bug, *Anasa tristis* (DeGeer) (Figure 1) is a pest of cucurbits, with a particular preference for pumpkins and squash. Squash bugs have a piercing-sucking mouth part. Squash bug damage includes leaf necrosis, rapid plant wilt, and scarred fruits. Feeding symptoms can include yellow to brown spots on the leaves, but if feeding is heavy, the entire leaf will turn brown, then black, and dry out. Feeding on fruit can cause sunken, desiccated areas and/or scars that can make the fruit unmarketable. Wilting can occur when squash bug feeding severs xylem vessels, interrupting the flow of nutrients and water to the leaves and fruit of the

plant. Crop injury from feeding damage can result in reduced yields, delayed plant growth, and poor fruit storability. Squash bugs can also vector bacterial diseases such as angular leaf spot (*Pseudomonas syringae* pv. *lachrymans*, see Perennia's [Cucurbit Angular Leaf Spot](#) factsheet) and cucurbit yellow vine disease (*Serratia marcescens* – which has yet to be confirmed in Nova Scotia.) Angular leaf spot damage can manifest in the fruit of some varieties as watery lesions, resulting in unmarketable fruit (Figure 2). These bacteria, transmitted by the squash bug, colonize the plant phloem tissue, spreading to the remainder of the plant.

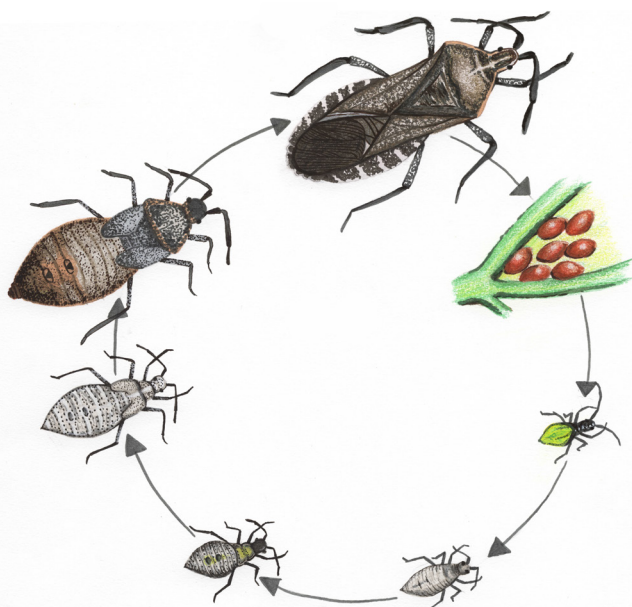


Figure 1. Life cycle of a squash bug (*Anasa tristis*).
Illustration by Jessica MacDonald.

Life cycle

Adult squash bugs are approximately 0.5-0.75 inches (1.2 - 2 cm) in length and overwinter under crop debris, stones, or clods of soil. They can also be found in nearby wood piles and around building foundations. Warm winters favour adult survival, increasing the odds of high pest pressure the following year. Adults usually start to appear around the time that vines start to run. The elliptical, flat-tish, bronze coloured eggs (Figure 1) are usually laid on the underside of leaves. They are laid in groups of 12-20, usually in the crux of leaf veins giving the egg clusters a V-shaped pattern. After one to two weeks, the first nymphal instar (im-

mature squash bug) will emerge. There are five nymphal instars, which all look slightly different, the smallest is 0.1 inch (.25 cm) and the largest is 0.5 inch (1.25 cm) (Figure 1). From emergence from the egg to adulthood takes 4-6 weeks, and is dependent on temperature, relative humidity, food quality and availability. Pest populations will grow quickly during hot and dry conditions. Adults are long-lived and continue to lay eggs throughout the growing season, so it is not unusual to see multiple life stages in one field, although there is usually only one generation of squash bug per year. Nymphs will congregate on vines, leaves, and fruits, and will quickly disperse when disturbed.



Figure 2. Winter squash (var. Sweet Mama) showing internal damage due to systemic angular leaf spot infection.

Cultural and mechanical controls

An adult squash bug female can lay up to 250 eggs, so controlling populations before they become well established is a key factor in managing this pest. Starting in mid-June, crops should be scouted once a week, carefully inspecting ten groups of ten plants per field. Pay particular attention to plants that appear wilted. Wilted plants should be removed, and adjacent plants should be checked for squash bugs.

Good weed control is crucial to reducing squash bug habitat in the field. Maintaining healthy plants is one of the best defenses against this pest as

healthy plants can withstand a greater amount of feeding damage without suffering yield loss. Steps should be taken to limit the overwintering adult population. Immediately after harvest, crop residue should be destroyed as adults will continue to feed and store up fat to help them survive the winter. Depriving adults of this important food source by incorporating crop residue will diminish their survivability over the winter. Wood piles and other debris near squash fields should be avoided when possible as they provide overwintering habitat. Growers with smaller acreage can place a board on the ground in between squash rows before cool nights, and the squash bugs will hide underneath the board. Simply turn the board over early the next morning and squash the bugs.

Crop rotation is an important defense against squash bugs. Fields should never be planted back-to-back with cucurbits. Adult squash bugs are extremely mobile and can easily move between nearby fields. Row covers can be an important defense against squash bugs early in the growing season and will protect the crop from cucumber beetles as well. However, once the crop starts to flower, row covers need to be removed to allow for pollination.

There are some varietal differences in susceptibility to squash bugs. Butternut, Royal Acorn, and Sweet Cheese have shown more resistance to squash bugs than other varieties. Growers may want to observe varietal differences in squash bug preference in their own fields.

Chemical control options

Most chemical control methods work best on young nymphs as the adults are difficult to kill. Best management practices promote the control and suppression of the squash bug early in their life cycle, when the nymphs are first found. One egg cluster per plant has been identified as the treatment threshold, however it is important to note that eggs are impervious to insecticides. Once egg clusters have been found in the field, the plants should be marked and checked daily to determine when the nymphs emerge. Pesticide

applications should be timed to target this early life stage. Adult squash bugs will continue to lay eggs throughout the growing season, so weekly scouting should be maintained.

Squash bugs are known to develop resistance to pesticides, so it is important to rotate pesticide mode of action. Good pesticide coverage is essential as squash bugs will cluster on lower stems and the undersides of leaves. Use high volumes of water and small droplet size with sufficient turbulence to ensure thorough penetration of the crop canopy. Many pesticides registered for control of squash bugs are also harmful to bees, so it is important to time spray applications to protect pollinators. Please see Table 1 for a list of pesticides registered in Nova Scotia at the time of publication (June 2017) for the control of squash bug. Always read the label of any pesticide thoroughly and follow label instructions carefully.

Table 1. Chemical control options for squash bug control, June 2017. For the most recent and specific product information, always refer to and follow directions on the product label. Labels can be found at Health Canada's Pesticide Label Search: <http://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>

Active Ingredient	Group	Pesticide Product Name
carbaryl	1A	Sevin XLR
clothianidin	4A	Clutch 50WDG or Clothianidin
Lambda cyhalothrin	3	Warrior, Matador
Lambda-cyhalothrin and Chlorantraniliprole	3 28	Voliam Xpress

Please note that pesticide labels are continuously changing and therefore can cease to be current and accurate. If any information conflicts with the information on the label, always use the label recommendation.



Figure 3. The parasitic fly *Trichopoda pennipes* is a predator of squash bugs. Illustr. by Jessica MacDonald.

The parasitoid tachinid fly *Trichopoda pennipes* (Figure 3) is a natural enemy of squash bugs. The adult flies feed on nectar from plants such as wild carrot (Queen Anne's lace, *Daucus carota*) and meadowsweet (*Spiraea salicifolia*). Female flies can lay several hundred eggs; each female will lay one to several small white or gray oval eggs on large squash bug nymphs or adults. The larva will then burrow into the body, where it will live for approximately two weeks, at which point it will emerge from the host, killing the squash bug. Depending on location and weather conditions, there can be up to three generations of *T. pennipes* per year. *T. pennipes* larva can overwinter in the squash bug host, and will emerge in late spring/early summer. Parasitized squash bugs can continue to feed and lay eggs so this parasitic fly is not always sufficient to provide economic control.

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