Tolerance of seashore paspalum to Japanese beetle

In a laboratory study, some seashore paspalum cultivars showed better tolerance to feeding by Japanese beetle grubs.

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Japanese beetle (*Popillia japonica* Newman) is a pest of cool-season turfgrasses in the eastern United States. Although Japanese beetle feeds on all cool-season grasses, the range in susceptibility among warm-season turfgrasses is not known.

Our objective was to compare tolerance of seashore paspalum (*Paspalum vaginatum* Swartz) and other warm-season turfgrass species to Japanese beetle grubs. We compared grub survival and weight gain, foliar growth and root loss among seashore paspalum, zoysiagrass and bermudagrass cultivars in a two-year study.

Year 1 research

Turfgrass cultivars used in year 1 of the study were Durban, Sea Isle 1, Sea Isle 2000, Sea Dwarf, Salam, Sea Spray, Asul, Sea Isle Supreme, HI-10 and 561-79 (an Argentine selection) seashore paspalum; Cavalier and Palisades zoysiagrass; and TifSport and TifEagle bermudagrass. Turf was grown in pots in the greenhouse and infested with second- and third-instar grubs.

Foliar growth was clipped to a height of 2.4 inches (6 centimeters), oven-dried and weighed. About a month later, pots were destructively sampled, and grubs were counted and weighed. Roots and foliage were oven-dried and weighed. The design was a randomized complete block with eight replications. Eight uninfested pots of each grass type were maintained and sampled for comparison of root and foliage loss caused by grub feeding.

Year 2 research

In year 2, the same seashore paspalum cultivars were tested, except for HI-10 and 561-79, which were dropped from the study, and Forage Type Q and Kim-1, which were added. The other cultivars studied in the second year were Cavalier zoysiagrass and TifSport bermudagrass. Design, replication, uninfested controls and type of data collected were identical to those in year 1.

Year 1 results

Cultivar influenced grub survival and weight. Average survival ranged from 90% on Cavalier zoysiagrass to 20% on Sea Dwarf paspalum, and average grub weight at the end of the trial ranged from 184 to 249 milligrams. All grubs weighed the same when they were first placed in the pots, but average weight gain of larvae feeding on bermudagrass roots exceeded that of larvae feeding on Palisades zoysiagrass and HI-10 and Sea Spray seashore paspalum by about 40%.

In the first sampling period, grubs reduced foliar growth the least in Salam, Sea Dwarf, Sea Isle 2000 and Durban seashore paspalum.

In the second sampling period, cultivar affected foliar and root dry weights of infested and uninfested turf and the difference between the two. The difference in foliar growth between infested and uninfested pots was least for Durban and 561-79 seashore paspalum, although Durban was not significantly different from seven other selections.

Sea Isle 2000, HI-10 and Salam seashore pas-

palum suffered the least root loss.

Grub survival and final weights varied among cultivars, but they were similar among genera, and grub weight gain was greatest on zoysiagrass. Seashore paspalum had the lowest foliar-growth dry weights from infested grasses in both samples and from uninfested grass in the first sample, but foliar-growth dry weights were similar for all grasses in the second sample. The growth differences in the first and second samples also were similar among genera. Seashore paspalum had the lowest root dry weights for infested and uninfested pots and the growth difference between the two.

Year 2 results

Grub survival varied with cultivar, but grub weight and average weight difference at the end of the trial did not. Average survival rate ranged from 45% on Cavalier zoysiagrass to 18% on Sea Isle Supreme seashore paspalum. In the first sampling period, Kim-1, Sea Isle 2000, Sea Spray and TifSport showed an increase in foliar growth compared with uninfested controls.

In the second sampling period, cultivar influenced foliar and root dry weights for infested grasses, uninfested controls and the difference between the two. At the end of the trial, TifSport bermudagrass had the best foliar growth, and TifSport and Sea Spray and Kim-1 seashore paspalum had the least root loss.

Grub survival, final weight and weight difference were similar among the three genera. In the second sample, bermudagrass and seashore paspalum had the lowest foliar-growth dry weight of infested grasses and weight of uninfested grasses, and growth differences were least for bermudagrass.

Among all three genera in year 2, infested and uninfested root dry weights were least for seashore paspalum, but root-growth difference was similar for all species.

Discussion

Among the seashore paspalum cultivars evaluated, 561-79, Sea Isle 2000, Durban, HI-10, Kim-1, Sea Dwarf and Sea Spray showed improved ability to tolerate grub feeding, which was measured by reduced impact on foliar growth. We expected cultivars with the largest root mass to be most tolerant of grub injury. Among seashore paspalum cultivars, Sea Dwarf had the largest root mass, but it also had the largest root loss. Of all the cultivars tested, Cavalier and Palisades zoysiagrass and TifSport bermudagrass had the highest uninfested root weights. Seashore paspalum cultivars that lost the least root mass — Sea Isle 2000, HI-10 and Salam in year 1 and Sea Spray in year 2 — were among those demonstrating the best foliar growth despite grub feeding. Grubs gained the most weight and consumed the most roots on TifEagle bermudagrass. Grub survival varied considerably between years.

Japanese beetle grubs (left) feed on the roots of a variety of plants, including grasses, and the adults (right) feed on the foliage and flowers of nearly 300 host species. **Photos courtesy of K. Braman**

Future research

Seashore paspalum cultivars vary in their response to other important pests affecting turfgrass in the southeastern United States. Cultivars that better tolerate Japanese beetle larval feeding in the greenhouse require evaluation under low-maintenance conditions in the field. Cultivar may also influence predation or parasitism by natural enemies of Japanese beetle grubs, providing opportunities for pest management and conservation biological control that merit further research.

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