GRANULAR FORMS OF Na AND K AZIDES APPLIED TO ESTABLISHED TURF

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In 2006 and 2007 granular formulations of sodium (Na) and potassium (K) azides were studied to determine tolerance levels on established turf and to evaluate their potential as turfgrass nematicides. The azide salts were impregnated on granular carriers consisting of Profile® fired clay and Biodac®, a cellulose-based product. Studies were conducted in Alabama on both creeping bentgrass and hybrid bermudagrass, and in Florida on hybrid bermudagrass. Tolerance tests were conducted on loamy sand native soils as well as sand-based putting greens. Turf tolerance was evaluated visually and through root-growth determinations. Nematode response was determined by comparing nematode counts among treatments.

Turfgrass Research Unit, Auburn, AL: A small-plot replicated test was conducted in 2006, to determine bentgrass tolerance to Na azide. The soil was loamy sand with a pH of 6.4. Treatments were 0, 5, 10, and 15 lb ai/A of Na azide/ Profile. Applications were made three times at 1-month intervals. Bentgrass phyoxicity was moderate with the 15 lb ai/A rate after the first application. Within 2 weeks the injury level was slight. Surface moisture was high at the time of the first application due to a thick mat layer. To improve surface infiltration, the putting green was core aerified prior to subsequent treatments. Turfgrass injury for the second and third applications at all three rates was slight. This site was also used in 2006 and 2007 to compare Na and K azide on both Profile and Biodac applied at 0, 5, 10, and 15 lb ai/A. Moderate injury levels occurred with the 15 lb ai/A rate of both chemicals and carriers. However, the turf recovered from injury by 3 weeks after application. Another study was conducted on a 'Mini-Verde' bermudagrass on a sand-based putting green using a single rate, 20 lb ai/A, of both azides and carriers that was applied three times each at 2-week intervals. Bermudagrass injury was slight at this treatment rate. Turf color was enhanced on all azide-treated plots compared to non-treated controls with no significant difference between Na and K azide and carriers.

Grand National Golf Club, Opelika, AL: Tolerance tests were conducted on a sand-based creeping bentgrass putting green with a pH 6.8 in 2006 and repeated in 2007. Treatments included 0, 5, 10, and 15 lb ai/A of Na azide/Profile applied three times with a 4-week interval between the first and second application and a 2-week interval between the second and third applications In 2006, moderate injury did not occur until the third application at the high rate. In 2007, the third

application was not irrigated immediately after application and severe injury occurred at the high rate. Nematode efficacy was evaluated in 2006 and efficacy data is still being collected for 2007. Ring (*Criconemoides* spp.) and stubby root (*Tricodorous* spp.) nematodes were both present at potentially damaging numbers prior to application. After the third application, populations of both nematodes decreased with increasing rates of azide. Root lengths increased in treated plots compared to non-treated controls. A turf-tolerance and nematode-efficacy study also was conducted on a sand-based 'Tifdwarf' bermudagrass green. This treatment included 15 lb ai/A Na azide/ Profile applied three times at 2-week intervals. This location had a moderate population of root knot (*Meloidogyne* spp.) and ring nematodes. After the third application, populations of ring nematode were eliminated in azide-treated plots and numbers of root-knot juveniles were greatly reduced compared to the untreated controls. Turfgrass injury was slight after all applications.

Sebring, FL, Dr Crow: In 2006, a trial was conducted on a sand-based 'Tifgreen' bermudagrass putting green infested with damaging numbers of sting (*Belonolaimus longicaudatus*) and lance (*Hoplolaimus galeatus*) nematodes. The trial compared Na azide/Profile applied twice at a 20 lb ai/A rate with a 3-week treatment interval with non-treated controls. Comparisons of nematode counts, turf density, root length, and number of root tips were made between the two treatments. Populations of both nematodes were greatly reduced after the second application. Turf density began to improve 3 days after the first application, but was set back by phytotoxicity after the second application. The phytotoxicity appeared to be largely due to poor application. The turf recovered rapidly and improved through the remainder of the evaluation period. The root length and root tip numbers were greatly enhanced by azide applications.

Kiva Dunes Golf Club in Gulf Shores, AL: A study was conducted on a 'Tifway' bermudagrass tee using 20 lb ai/A of Na azide on both Profile and Biodac to evaluate sting nematode control and turf tolerance. Nematodes were evaluated after the second application and populations were greatly reduced compared with untreated controls. Turf color in treated plots was enhanced after the first application with no significant difference in granular carriers.

Conclusion: Granular formulations of Na and K azide have potential nematicidal properties on established hybrid bermudagrass and creeping bentgrass. A rate of 20 lb ai/A for hybrid bermudagrass appears optimum while 10 lb ai/A rate appears optimum for creeping bentgrass. Two to three applications may be required to reduce nematode populations to acceptable levels, depending on nematode species and population densities. These trials have also shown that irrigation with 0.25-0.50 inches of water immediately after application, followed by the same amount within a 24-hour period, helps reduce the risk of phytotoxicity. In all studies, when moderate turfgrass injury occurred, the turf recovered rapidly and within 2 to 3 weeks, and turf color and root growth were enhanced. Profile and Biodac proved to be excellent carriers for these azide salts.