

Effect of Fertilizer Formulations Containing Milorganite on Creeping Bentgrass, Zoysiagrass and Kentucky Bluegrass

Zac Reicher and Glenn Hardebeck

Objective

The objective of this study was evaluate four fertilizer formulations containing Milorganite to determine their effect on growth, visual quality and color of 'Penneagle' creeping bentgrass and 'Zenith' zoysia maintained at fairway height, and a Kentucky bluegrass blend maintained at lawn height.

Rationale

Slow release fertilizers are integral in most turf management schemes regardless if managing a golf course, homelawn, or athletic field. Slow release N can and should be used throughout the year, especially when a gradual release of N is needed during the spring and also during the warmer temperatures of summer and early fall. While the traditional formulation of Milorganite (6-2-0) provides slow release characteristics, limitations exist in the level of initial turfgrass response as well as the quantity of material necessary to apply the desired rate of actual nitrogen. These studies were designed to examine the response of three separate turf species to various fertilizer formulations containing Milorganite and quick release nitrogen.

How It Was Done

The studies were located at the Wm. H. Daniel Turfgrass Research and Diagnostic Center at Purdue University, West Lafayette IN. The soil type was Starks-Fincastle silt loam. The areas were previously in corn and these were the initial turf plantings on the site. The areas included 'Penneagle' creeping bentgrass mowed at 1/2 inch, 'Zenith' zoysia mowed at 1/2 inch, and Kentucky bluegrass consisting of 'Merit', 'SR2100', 'Fairfax', and 'Freedom' mowed at 2.5 inches. Turf areas were irrigated to prevent moisture stress and clippings were not returned. No fertilizer was applied to the area in 2001 prior to initiation of the studies.

Fertilizer treatments were identical in all studies and included the following formulations containing Milorganite: 6-2-0, 5-1-5, 10-1-10, 16-1-9 and an untreated check. Treatments were applied to all studies Jun 11 and Jul 19 at 1.0 N/1000 ft² and thoroughly watered-in after application. Experimental design for each study was a randomized complete block with four replications. Clippings were harvested once each week from the creeping bentgrass and zoysia with one pass of a 12 inch wide reel-type greens mower. A 16 inch wide reel-type mower was used to harvest clippings from the Kentucky bluegrass in a similar manner. The clippings were oven-dried at 140°F for at least 48 hours prior to weighing. Plot area was left unmowed 3 to 6 days prior to clipping harvest. Plot size was 5 X 10 ft. Visual quality of plots was rated on a scale of 1 to 9 where 1=dead turf, 5=acceptable as a fairway, and 9=excellent. Color was also rated visually on a scale of 1 to 9 where

1=dead turf, 5=acceptable green for fairways, and 9=dark green. Data was recorded until treatment effects were no longer visible or dormancy. At the termination of the study all data was analyzed with SAS.

Results

Creeping Bentgrass

As expected, the two fertilizer formulations (10-1-10 and 16-1-9) containing Milorganite and quick release forms of nitrogen produced the quickest and most dramatic response after the initial application on Jun 11 (Figure 1). 10-1-10 and 16-1-9 both dramatically increased clipping production over the remaining treatments but were never significantly different from one another. The second application of 10-1-10 and 16-1-9 on Jul 19 again increased clipping production, which had begun to tail off the previous week but to a lesser degree than the initial application. Higher temperatures during July and August likely tempered fertility effects on growth. 6-2-0 and 5-1-5 did not significantly increase clipping production until the fourth week after the initial application and the first two weeks after the second.

Turfgrass quality and color data were very similar with respect to the various treatment effects (Figures 2 and 3). Quality and color were both improved initially by 10-1-10 and 16-1-9 over that of the remaining treatments. After two weeks, quality and color of all fertility treatments were similar but improved over the check until Aug 6. After Aug 6, differences between the treatments and the check decreased due to improved growing conditions and less fertility effect.

Zoysia

Zoysia was slower to respond to each fertility application than the creeping bentgrass. 10-1-10 and 16-1-9 increased clipping production on the zoysia during the second and third week after the initial application on Jun 11 and then again two weeks after the second application on Jul 19 (Figure 4). 5-1-5 increased clipping production over that of the check on Jul 30.

Again turfgrass quality and color data were very similar with respect to the various treatment effects (Figures 5 and 6). 10-1-10 and 16-1-9 provided a quick initial increase in quality and color over the check and maintained that improvement through Aug 26. 6-2-0 and 5-1-5 improved color over the check Jul 15 through Aug 26 and improved quality over the check Jul 22 through Aug 26.

Kentucky bluegrass

10-1-10 and 16-1-9 dramatically increased clipping production over that of the check during the first three weeks after the initial application on Jun 11 (Figure 7). 6-2-0 and 5-1-5 increased clipping production over the check on Jul 30 after the second application.

All fertility treatments improved both quality and color over the check on the majority of dates from Jun 17 through Aug 12 (Figures 8 and 9). 10-

1-10 and 16-1-9 increased quality and color over that of 6-2-0 and 5-1-5 one week after the initial application.

Summary

Both quick release fertilizer and slow release fertilizer can and should be utilized to maintain quality turfgrass areas. When blended and used properly, the benefits of each improve the overall response of the turfgrass for early summer through early fall applications. Milorganite blended with a quick release form of nitrogen provided a quicker initial response, which is preferable in most turfgrass management situations while the presence of the slow release component, Milorganite, may provide benefits such as reducing the burn potential to the turfgrass. The blend of quick release nitrogen and Milorganite improved turfgrass performance in these studies, while causing no negative effects. Additionally, the higher nitrogen content of the blended products decreased the amount of product that must be handled for a particular application rate.

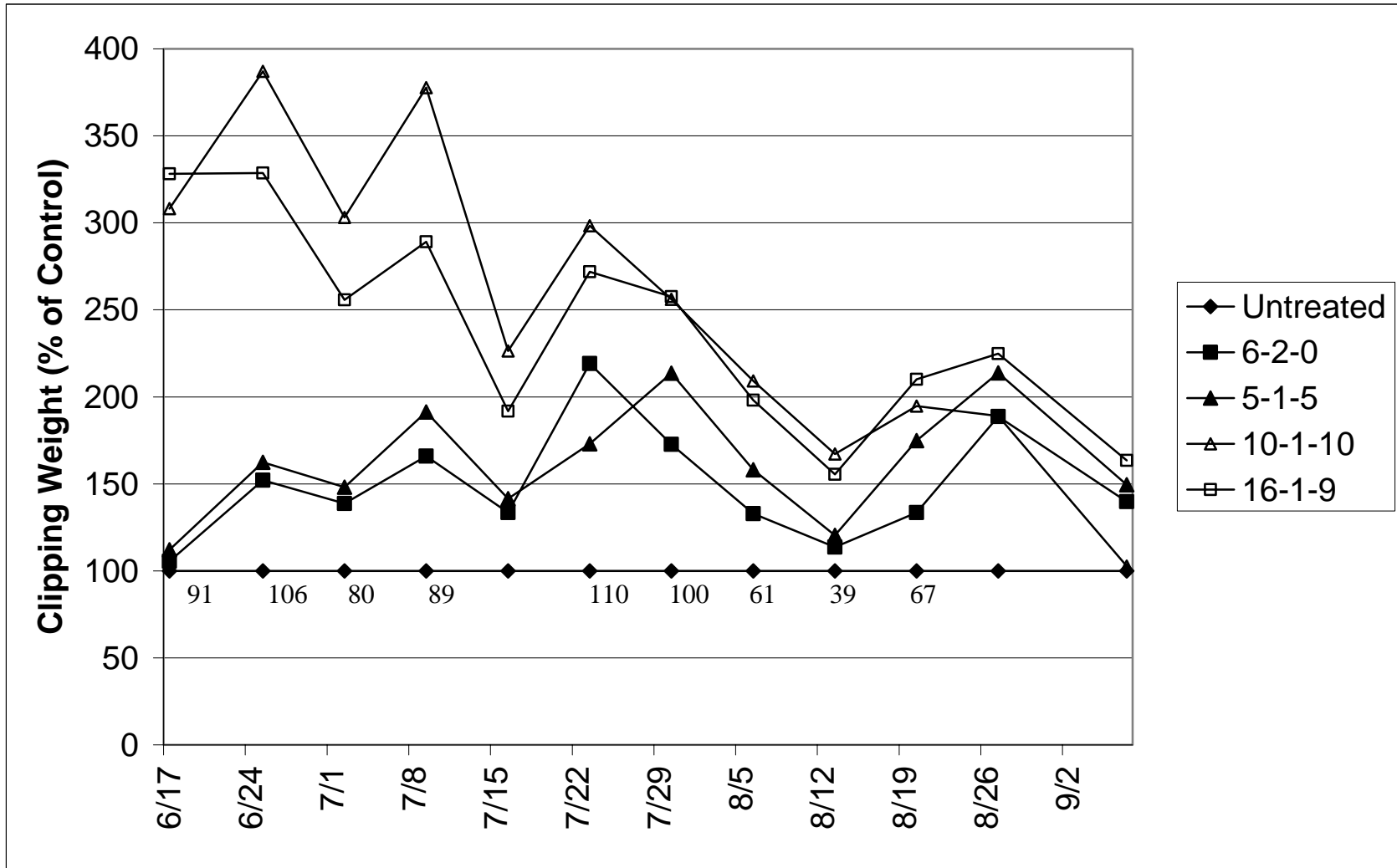


Figure 1. Effect of fertilizer formulations containing Milorganite on clipping weights of ‘Penneagle’ creeping bentgrass mowed at 1/2 inch. Fertilizers were applied on Jun 11 and Jul 19. Numbers listed below data points represent the LSD (0.05) for separating treatment means.

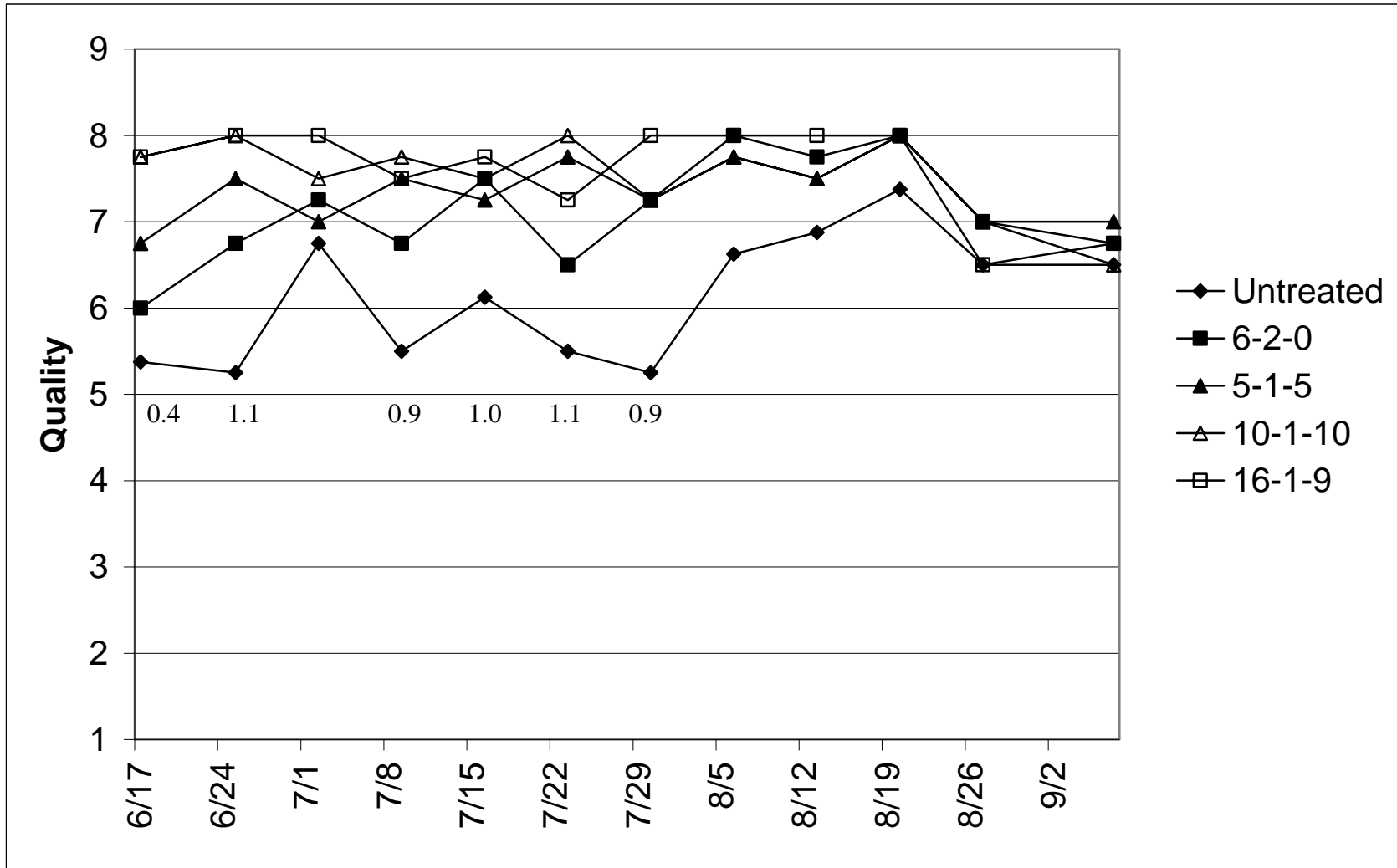


Figure 2. Effect of fertilizer formulations containing Milorganite on visual quality of ‘Penneagle’ creeping bentgrass mowed at 1/2 inch. Fertilizers were applied on Jun 11 and Jul 19. Visual quality of plots was rated on a scale of 1 to 9 where 1=dead turf, 5=acceptable as a fairway, and 9=excellent. Numbers listed below data points represent the LSD (0.05) for separating treatment means.

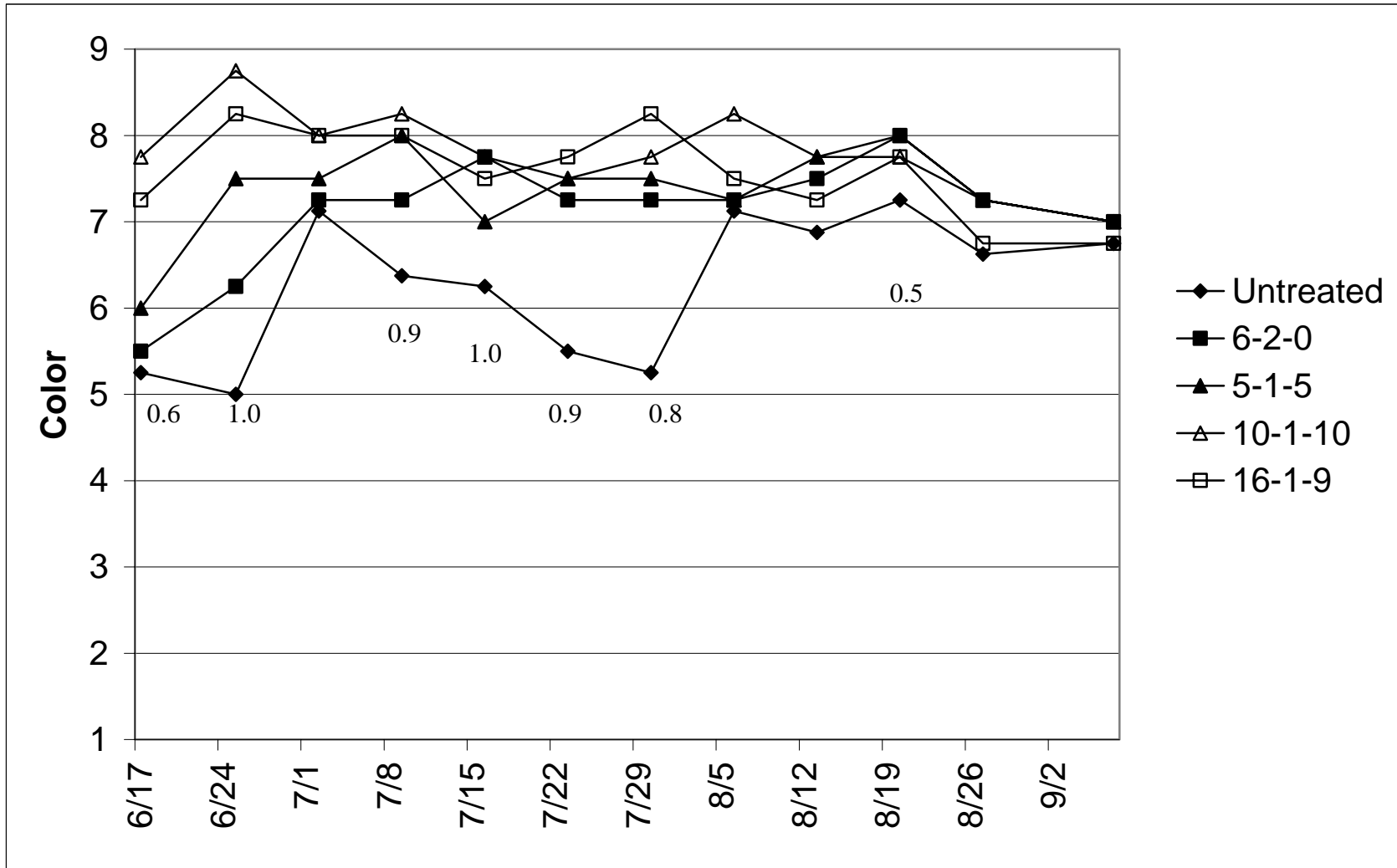


Figure 3. Effect of fertilizer formulations containing Milorganite on color of 'Penneagle' creeping bentgrass mowed at 1/2 inch. Fertilizers were applied on May Jun 11 and Jul 19. Color was also rated visually on a scale of 1 to 9 where 1=dead turf, 5=acceptable green for fairways, and 9=dark green.

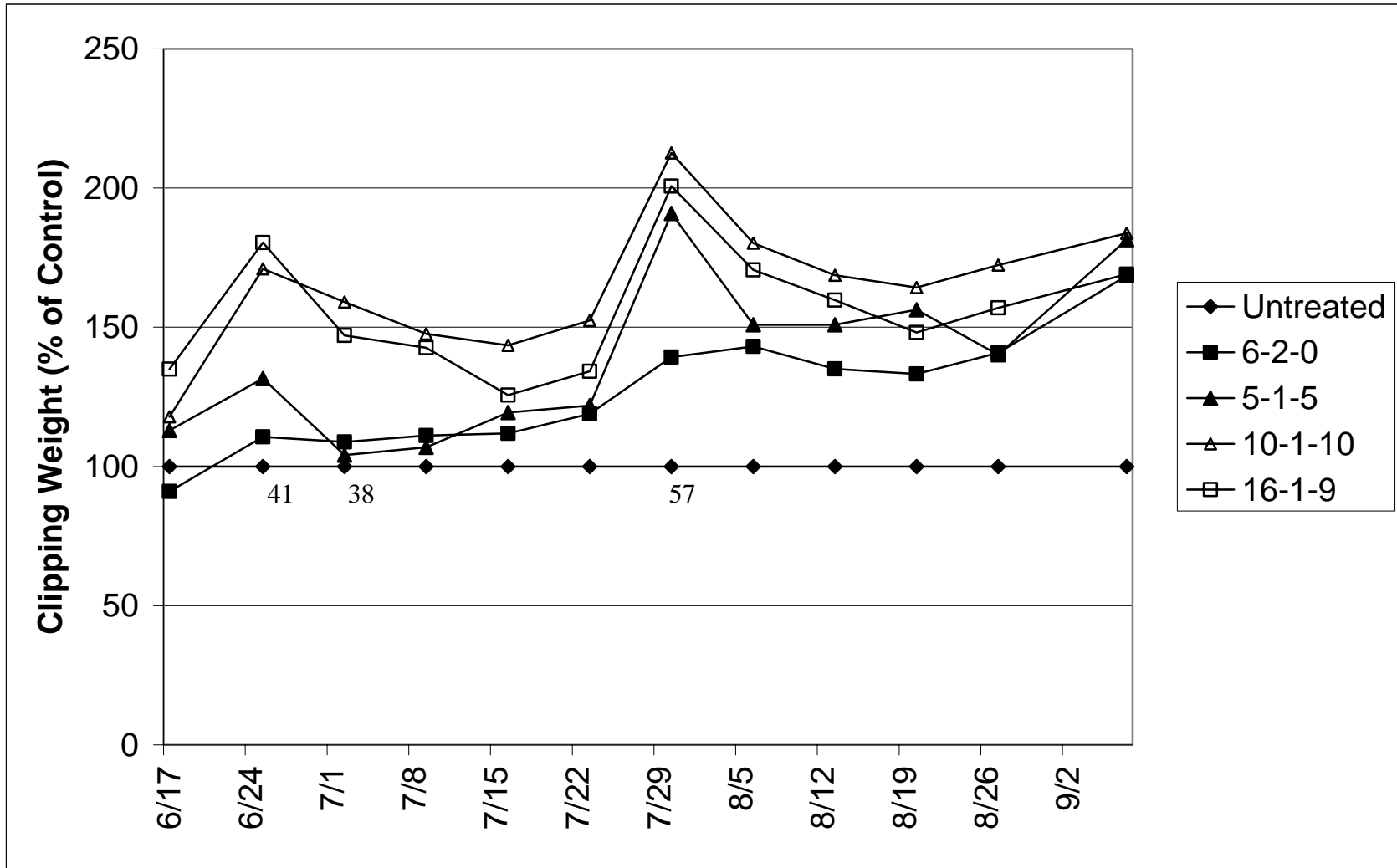


Figure 4. Effect of fertilizer formulations containing Milorganite on clipping weights of ‘Zenith’ zoysia mowed at 1/2 inch. Fertilizers were applied on Jun 11 and Jul 19. Numbers listed below data points represent the LSD (0.05) for separating treatment means.

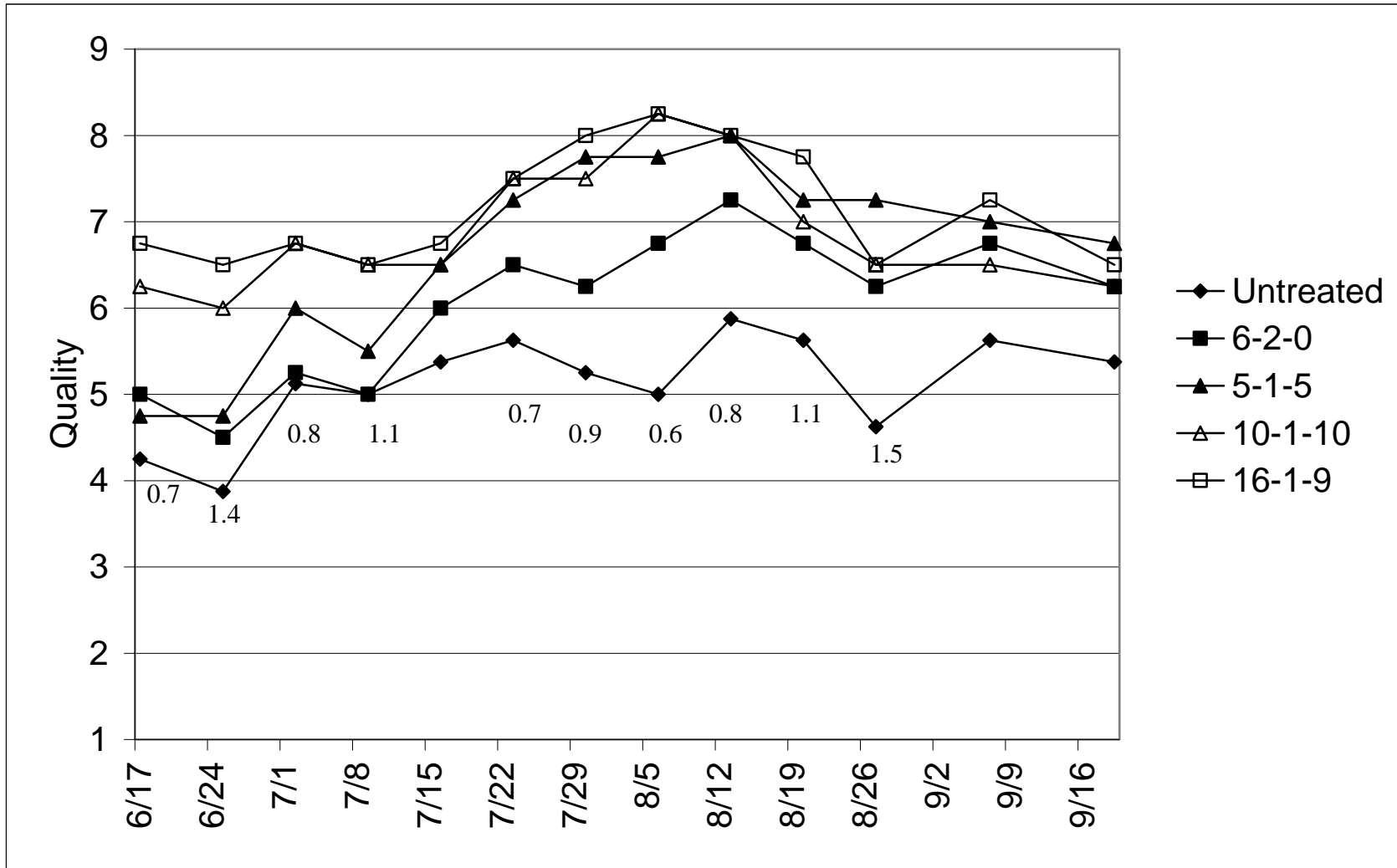


Figure 5. Effect of fertilizer formulations containing Milorganite on visual quality of ‘Zenith’ zoysia mowed at 1/2 inch. Fertilizers were applied on Jun 11 and Jul 19. Visual quality of plots was rated on a scale of 1 to 9 where 1=dead turf, 5=acceptable as a fairway, and 9=excellent. Numbers listed below data points represent the LSD (0.05) for separating treatment means.

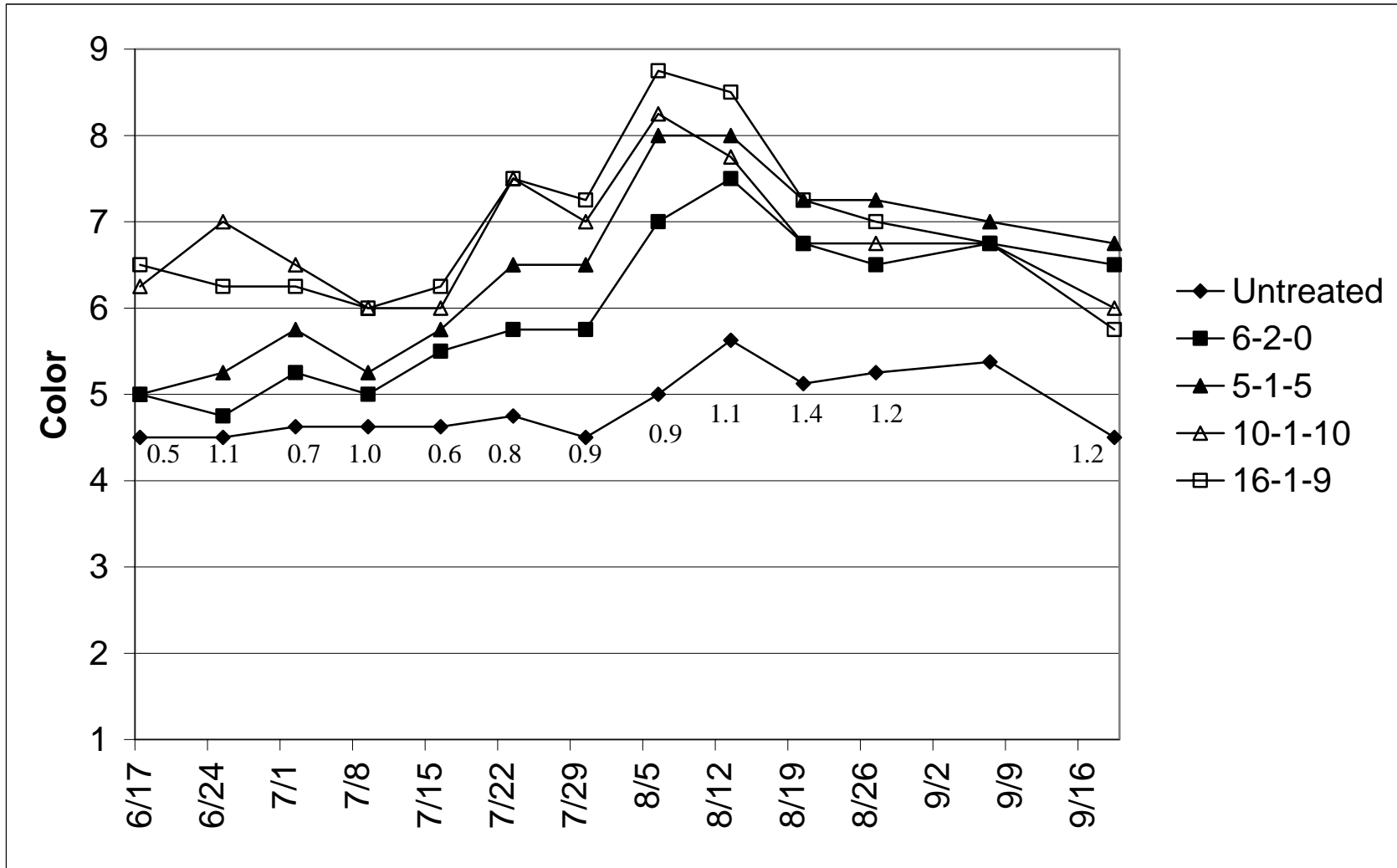


Figure 6. Effect of fertilizer formulations containing Milorganite on color of ‘Zenith’ zoysia mowed at 1/2 inch. Fertilizers were applied on May Jun 11 and Jul 19. Color was also rated visually on a scale of 1 to 9 where 1=dead turf, 5=acceptable green for fairways, and 9=dark green.

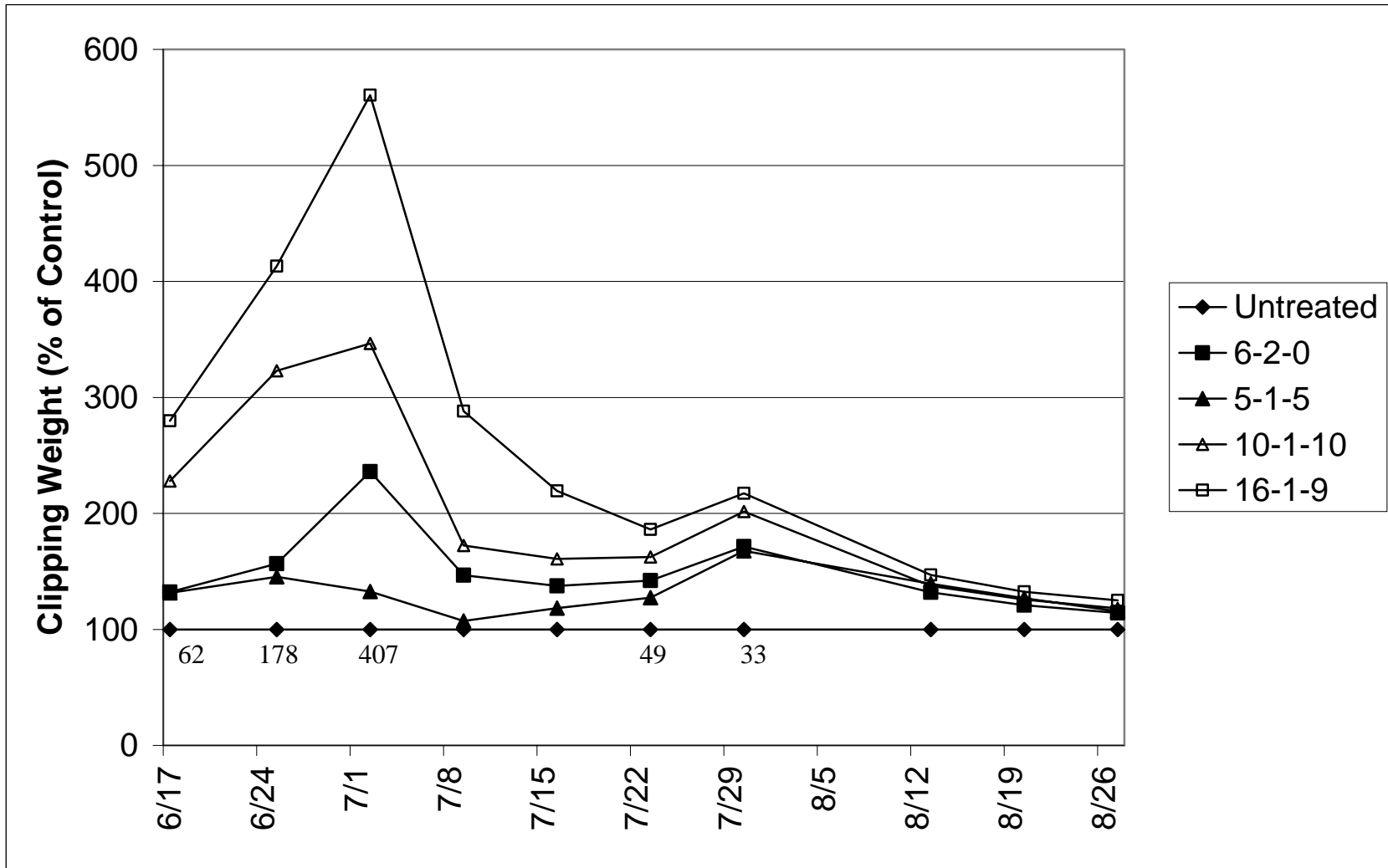


Figure 7. Effect of fertilizer formulations containing Milorganite on clipping weights of Kentucky bluegrass mowed at 2.5 inches. Fertilizers were applied on Jun 11 and Jul 19. Numbers listed below data points represent the LSD (0.05) for separating treatment means.

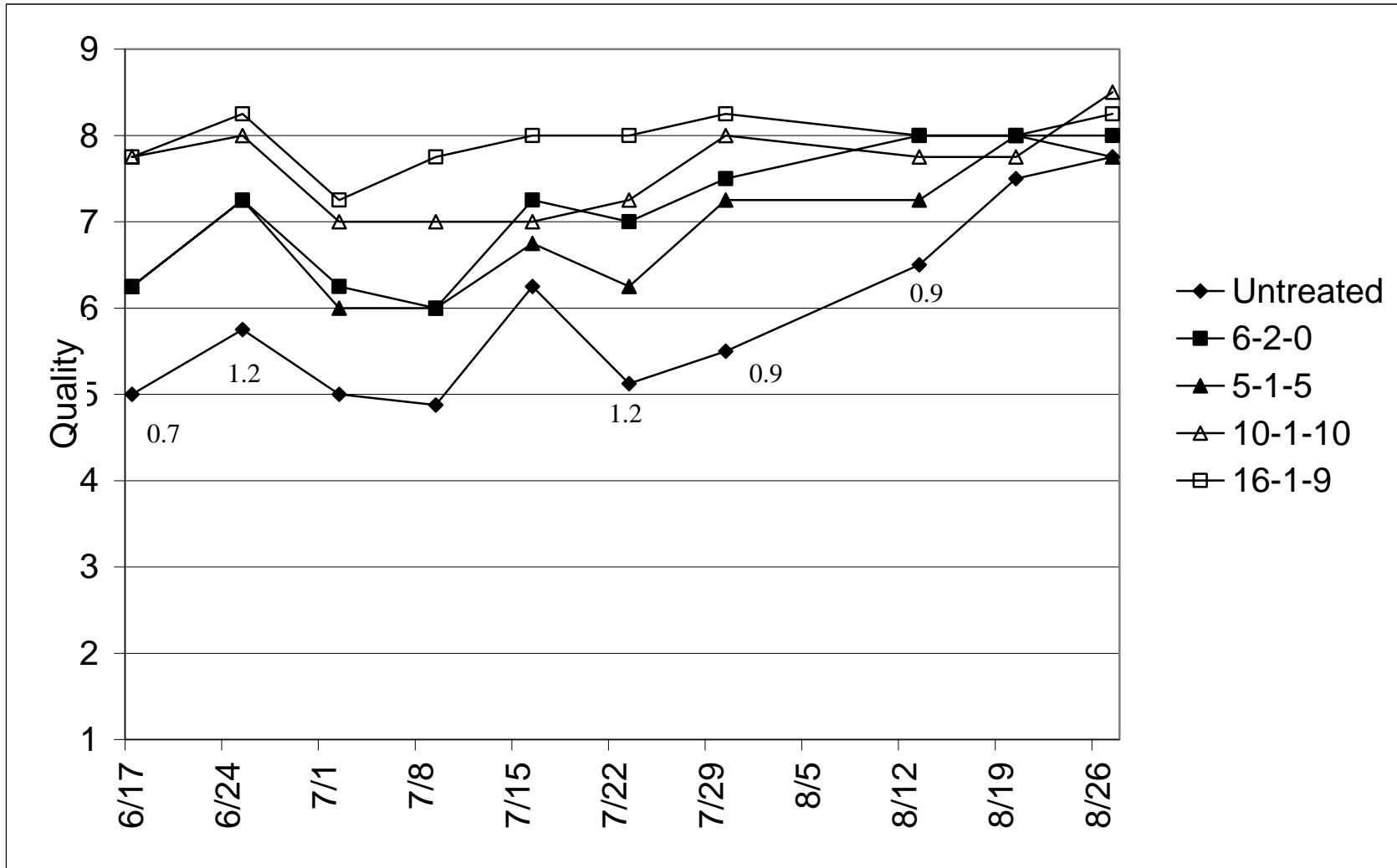


Figure 8. Effect of fertilizer formulations containing Milorganite on visual quality of Kentucky bluegrass mowed at 2.5 inches. Fertilizers were applied on Jun 11 and Jul 19. Visual quality of plots was rated on a scale of 1 to 9 where 1=dead turf, 5=acceptable as a fairway, and 9=excellent. Numbers listed below data points represent the LSD (0.05) for separating treatment means.

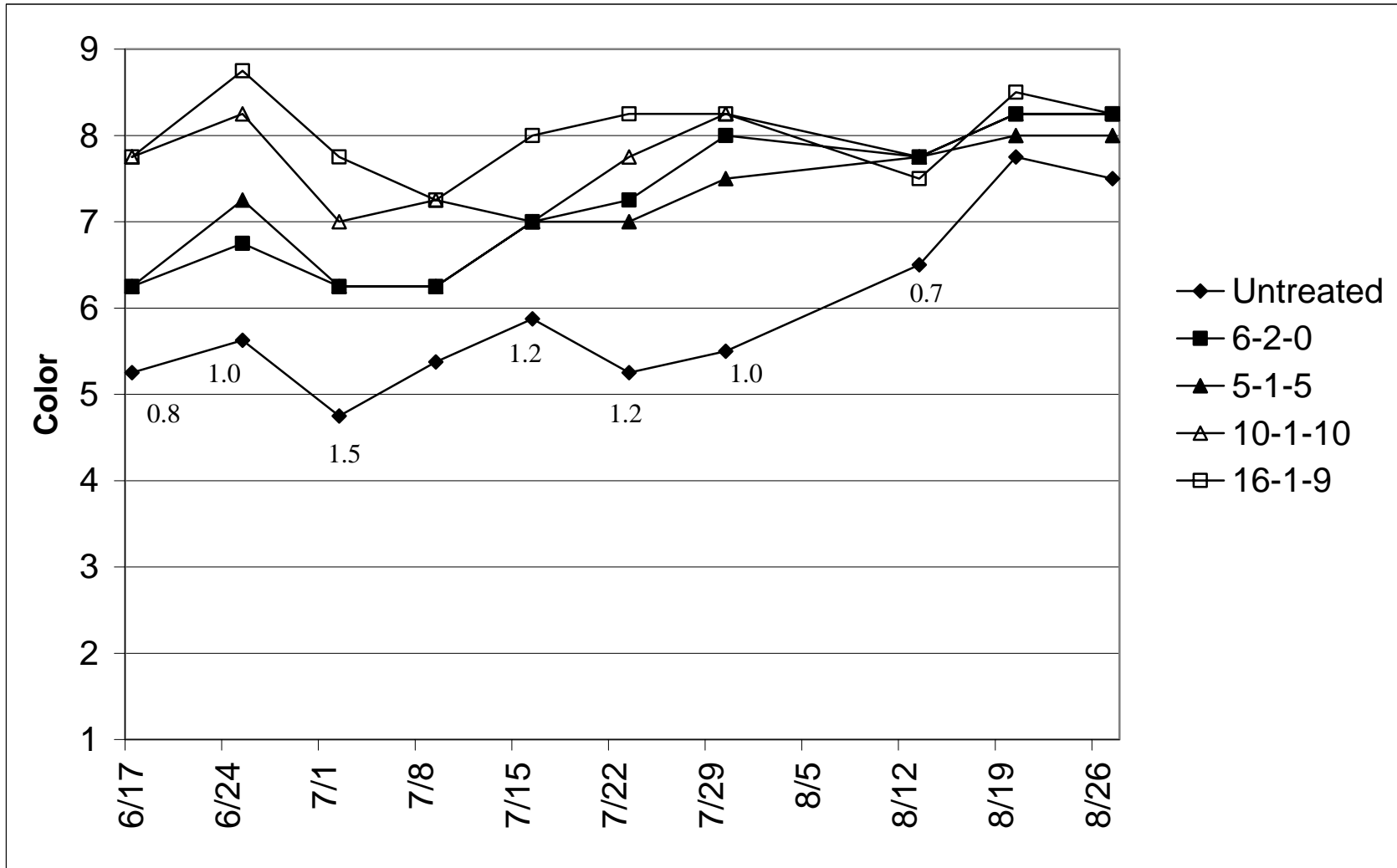


Figure 9. Effect of fertilizer formulations containing Milorganite on color of Kentucky bluegrass mowed at 2.5 inches. Fertilizers were applied on May Jun 11 and Jul 19. Color was also rated visually on a scale of 1 to 9 where 1=dead turf, 5=acceptable green for fairways, and 9=dark green.