

# Safety of Mesotrione 4SC when Applied to Sensitive Turf Species Grown in Mixtures

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A field study was conducted at the Washington State University Turfgrass and Agronomy Research Center (TARC), in Pullman, WA, during the summer of 2007 to evaluate the safety of mesotrione 4SC applied as a spray to a 2-way mixture of cool-season turfgrasses. The 2-way mixture of cool-season turfgrasses were: 'Gallery' perennial ryegrass and 'Treasure' chewings fescue in an 8:1 ratio by weight, respectively. By seed number the mixture was comprised of 80% perennial ryegrass and 20% chewings fescue. The study was planted on 30 May 07 at a seeding rate of 5 lbs/M. The research site was irrigated to prevent water stress. Spray applications were made on 18 Jul 07 and split applications applied 3 weeks later on 9 Aug 07 with a bicycle-wheeled CO<sub>2</sub> pressurized sprayer with 11002 flat fan spray tips at 25 GPA. The research site was mowed 2 times per week following the initial mowing with a Toro 22" rotary rear bag push mower at a mowing height of 1.5". Phytotoxicity was rated using a scale of 0-10, with 10 = dead turf and levels above 2 as unacceptable. Turfgrass quality was rated using a rating scale of 1-9, with 9 equal to excellent turfgrass quality and levels below 6 as unacceptable. A randomized-complete block design was used with four replications and individual treatment plots were 6' x 9'.

Following a single application of mesotrione, phytotoxicity was the highest and most prolonged with the 560 g ai/ha rate, as one would expect, with levels of phytotoxicity above 2 from 2 to 4 WAT (Table 1 and Figure 1). Mesotrione, applied at either the 280 or 350 g ai/ha rate, resulted in some phytotoxicity up to 4 WAT but never above a rating of 2. No phytotoxicity was observed after a single application of mesotrione either at the 175 or 210 g ai/ha rates. However, following the split application of mesotrione at 175 or 210 g ai/ha a slight amount of phytotoxicity was noticed 1 to 3 weeks later (Table 1 and Figure 2). Split applications of mesotrione at 280 or 350 g ai/ha had some level of phytotoxicity following the initial application and then a slight increase following the split application.

At 1 WAT, turfgrass quality was not different among any of the treatments (Table 2 and Figures 3 and 4). However, by 2 WAT a significant decrease in turfgrass quality was observed especially at rates above 280 g ai/ha. Interestingly, mesotrione

applied at 560 g ai/ha resulted in the lowest turfgrass quality at 2 and 3 WAT, but by 8 WAT was at least numerically (not significantly) higher than any of the other treatments including the check. I don't have a good explanation for this. This is only speculation, and I do not have any numbers to back it up, but maybe some of the 'Treasure' chewings fescue had been killed out. Since 'Treasure' chewings fescue has a lighter green genetic color than 'Gallery' perennial ryegrass, lower levels of chewings fescue in the stand may make the overall stand look darker green thus higher quality ratings. Mesotrione applied at either the 175 or 210 g ai/ha rate had, for the most part, the same turfgrass quality as the check throughout the 8 weeks of the study. Split applications of mesotrione at 175 g ai/ha had the same turfgrass quality as the check up to 8 WAT. A significant decrease in turfgrass quality was observed following each of the 210, 280, and 350 g ai/ha split application treatments.

In summary, no significant amount of phytotoxicity was observed following mesotrione applied alone or as a split application at 175 or 210 g ai/ha. However, only after the single application of mesotrione at 560 g ai/ha was an unacceptable level of phytotoxicity attained. Mesotrione had a much greater affect on turfgrass quality than phytotoxicity. With split applications of mesotrione at 280 and 350 g ai/ha and applied alone at 560 g ai/ha showing the largest decrease in turfgrass quality. Mesotrione applied at either 175 or 210 g ai/ha rate had turfgrass quality ratings very similar to the check throughout the 8 weeks of the study.

Table 1. Phytotoxicity of mesotrione on a mixed stand of perennial ryegrass/chewings fescue.

| Treatment        | Mesotrione<br>(g ai/ha) | NIS<br>(% V/V) | App.<br>date | Phytotoxicity*   |                 |                 |                  |                  |                  |                  |
|------------------|-------------------------|----------------|--------------|------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
|                  |                         |                |              | 7/25/07<br>1 WAT | 8/1/07<br>2 WAT | 8/8/07<br>3 WAT | 8/15/07<br>4 WAT | 8/22/07<br>5 WAT | 8/29/07<br>6 WAT | 9/12/07<br>8 WAT |
| Mesotrione + NIS | 175                     | 0.25           | 1            | 0.0              | 0.0 e**         | 0.0 e           | 0.0 d            | 0.0 c            | 0.0 c            | 0.0              |
| Mesotrione + NIS | 210                     | 0.25           | 1            | 0.0              | 0.0 e           | 0.0 e           | 0.0 d            | 0.0 c            | 0.0 c            | 0.0              |
| Mesotrione + NIS | 280                     | 0.25           | 1            | 0.0              | 0.8 cd          | 0.8 cd          | 0.3 cd           | 0.0 c            | 0.0 c            | 0.0              |
| Mesotrione + NIS | 350                     | 0.25           | 1            | 0.0              | 1.3 bc          | 1.3 bc          | 0.8 bc           | 0.0 c            | 0.0 c            | 0.0              |
| Mesotrione + NIS | 560                     | 0.25           | 1            | 0.0              | 2.8 a           | 2.8 a           | 2.0 a            | 0.5 bc           | 0.0 c            | 0.0              |
| Mesotrione + NIS | 175                     | 0.25           | 1 & 2        | 0.0              | 0.0 e           | 0.0 e           | 0.0 d            | 0.3 c            | 0.0 c            | 0.0              |
| Mesotrione + NIS | 210                     | 0.25           | 1 & 2        | 0.0              | 0.0 e           | 0.0 e           | 0.3 cd           | 1.0 c            | 0.3 bc           | 0.0              |
| Mesotrione + NIS | 280                     | 0.25           | 1 & 2        | 0.0              | 0.5 de          | 0.5 de          | 1.0 b            | 2.5 a            | 1.0 a            | 0.0              |
| Mesotrione + NIS | 350                     | 0.25           | 1 & 2        | 0.0              | 1.5 b           | 1.5 b           | 1.3 b            | 2.5 a            | 0.5 b            | 0.0              |
| CHECK            | 0                       | 0              |              | 0.0              | 0.0 e           | 0.0 e           | 0.0 d            | 0.0 c            | 0.0 c            | 0.0              |

\* Phytotoxicity rated 0-10, with 10 = dead turf.

\*\*Values within a column followed by the same letter are not significantly different LSD  $P = 0.05$ .

Figure 1. Phytotoxicity of mesotrione 4SC, applied as a single application, on a 2-way mix of cool-season turfgrasses.

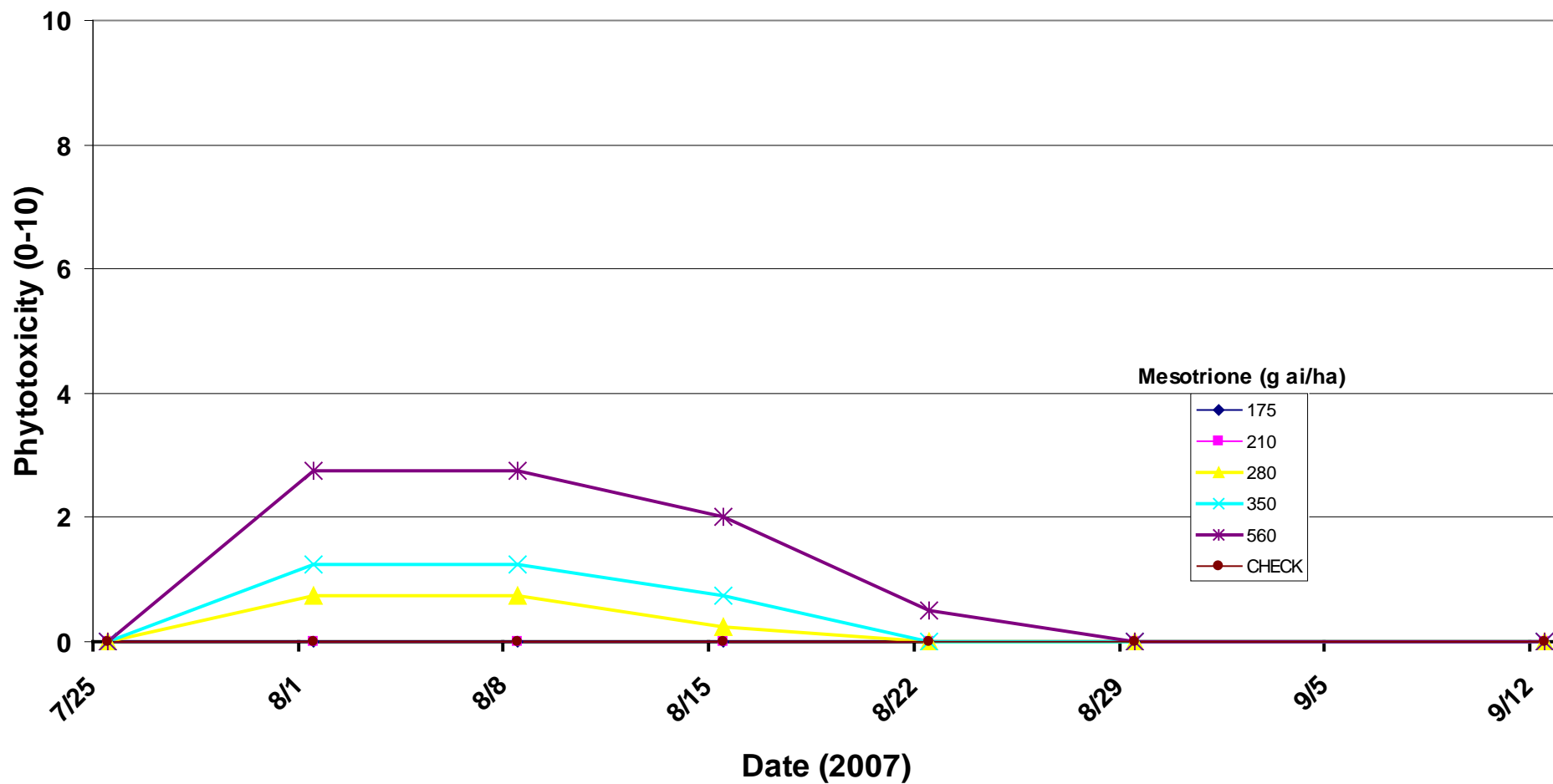


Figure 2. Phytotoxicity of mesotrione 45C, applied as a split application, on a 2-way mix of cool-season turfgrasses.

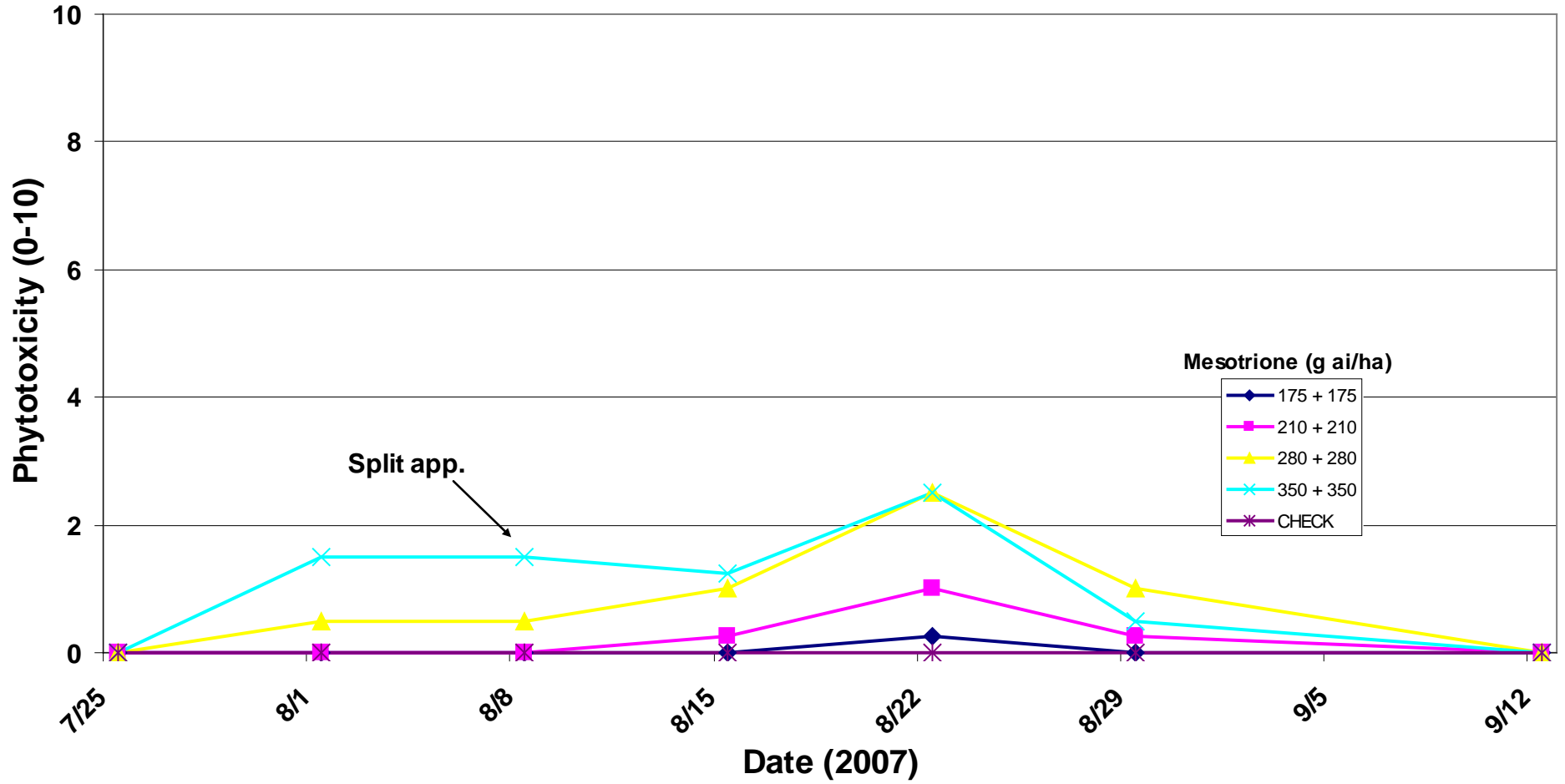


Table 2. The effect of mesotrione on turfgrass quality of a perennial ryegrass/chewings fescue turfgrass stand.

| Treatment        | Mesotrione<br>(g ai/ha) | NIS<br>(% V/V) | App.<br>date | Turfgrass quality* |                 |                 |                  |                  |                  |                  |
|------------------|-------------------------|----------------|--------------|--------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
|                  |                         |                |              | 7/25/07<br>1 WAT   | 8/1/07<br>2 WAT | 8/8/07<br>3 WAT | 8/15/07<br>4 WAT | 8/22/07<br>5 WAT | 8/29/07<br>6 WAT | 9/12/07<br>8 WAT |
| Mesotrione + NIS | 175                     | 0.25           | 1            | 6.0                | 6.0 ab**        | 5.6 abc         | 5.8 ab           | 6.3 a            | 6.5 abc          | 6.5 abc          |
| Mesotrione + NIS | 210                     | 0.25           | 1            | 6.0                | 5.5 bc          | 5.6 abc         | 6.0 ab           | 6.3 a            | 6.5 abc          | 6.3 bc           |
| Mesotrione + NIS | 280                     | 0.25           | 1            | 6.0                | 4.8 de          | 6.3 a           | 6.5 a            | 6.8 a            | 6.8 ab           | 6.5 abc          |
| Mesotrione + NIS | 350                     | 0.25           | 1            | 6.0                | 5.3 dc          | 5.0 c           | 6.0 ab           | 6.5 a            | 6.5 abc          | 6.5 abc          |
| Mesotrione + NIS | 560                     | 0.25           | 1            | 6.3                | 4.3 e           | 3.3 d           | 4.8 c            | 6.0 ab           | 7.0 a            | 7.0 a            |
| Mesotrione + NIS | 175                     | 0.25           | 1 & 2        | 6.3                | 6.5 a           | 5.8 abc         | 5.8 ab           | 6.0 ab           | 6.8 ab           | 6.8 ab           |
| Mesotrione + NIS | 210                     | 0.25           | 1 & 2        | 6.0                | 6.0 ab          | 5.8 abc         | 5.5 bc           | 5.3 b            | 6.3 abc          | 6.0 cd           |
| Mesotrione + NIS | 280                     | 0.25           | 1 & 2        | 6.3                | 5.0 cd          | 6.0 ab          | 5.8 ab           | 4.3 c            | 5.8 c            | 5.5 d            |
| Mesotrione + NIS | 350                     | 0.25           | 1 & 2        | 6.0                | 5.0 cd          | 5.3 bc          | 5.3 bc           | 4.0 c            | 6.0 bc           | 6.5 abc          |
| CHECK            | 0                       | 0              |              | 6.3                | 6.5 a           | 6.0 ab          | 6.0 ab           | 6.3 a            | 6.8 ab           | 6.5 abc          |

\* Turfgrass quality rated 1-9, with 9 = excellent.

\*\*Values within a column followed by the same letter are not significantly different LSD  $P = 0.05$ .

Figure 3. The effect of mesotrione 45C, applied as a single application, on turfgrass quality of a 2-way mix of cool-season turfgrasses.

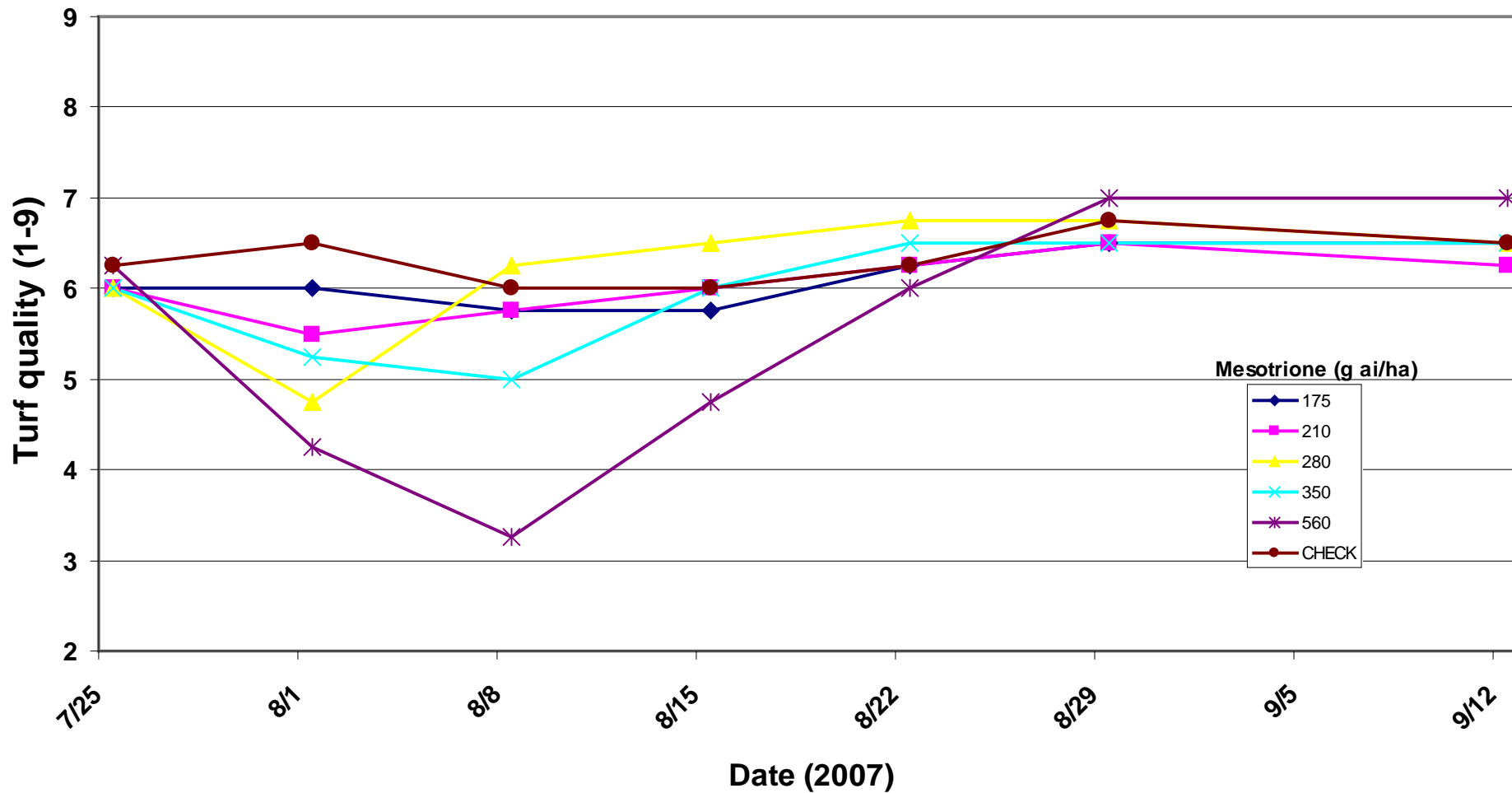


Figure 4. The effect of mesotrione 4SC, applied as a split application, on turfgrass quality of a 2-way mix of cool-season turfgrasses.

