

Factors affecting Italian ryegrass (*Lolium multiflorum* L.) seed distribution

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Introduction Italian ryegrass (*Lolium multiflorum* L.) can be a productive and high-quality cool-season forage in the Southern Great Plains of the U.S.A, if it is managed to produce sufficient seed for effective re-establishment without compromising forage yield. Before the re-seeding dynamics of Italian ryegrass can be modeled an understanding of seed production, seed-shed, and seed dispersal is necessary. Here two factors affecting Italian ryegrass seed dispersal and distribution are examined – wind and cultivation practice (mowing and raking).

Materials and methods Italian ryegrass was no-till overseeded into dormant unimproved warm-season pasture in the fall of 2002. Before heading the established ryegrass was mowed leaving four 1-m² uniform, grass blocks. Seed traps (15-cm dia.) were placed at intervals of 0, 0.3, 0.6, 0.9, 1.2 and 1.8 m from the edge of the stand in the eight cardinal directions. Trapped seed were counted every 7 to 10 days until the ryegrass was harvested on July 28, 2003. Immediately before harvesting, the seed traps were removed and a 0.09 m² area was vacuumed along the same cardinal directions and at the same spacing. After harvest additional vacuum samples were collected at each edge of the plot, as well as in the direction the forage was raked and piled for removal.

Results Since prevailing wind was from the south, the majority of the trapped seed was found north of the plots (Figure 1). Mean wind speeds recorded at the site ranged from calm to 6 m/sec, while gusts ranged from calm to 12 m/sec. Using a simple ballistic equation and mean wind speeds travel distances were estimated at 0.7 to 3.0 m, while at maximum wind speeds the estimated travel distance exceeded 6.0 m. Although some seed (8%) were trapped at 183 cm, 80% of the seed was found at 1 m or less from the edge of the plot. Forage removal by cutting and raking increased the seed deposition up to 61 cm from the plot's edge, as compared to the pre-harvest (trapped) seed estimates (Figure 2). Less seed than anticipated was recovered after harvest, and examination of the baled forage showed significant material still attached to the seed heads.

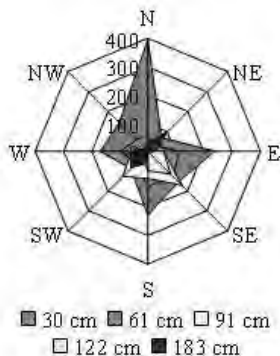


Figure 1 Seed distribution (seed/m²).

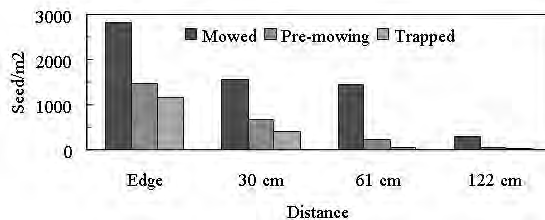


Figure 2 Seed distribution after forage harvest and removal.

Conclusions Some Italian ryegrass seed was wind dispersed, however most seed were found well within the estimated 3 to 6 m travel distance. Numerous seed were deposited at the edge of the plot, and the majority of the seed was within 1 meter of the plant stand. Mowing increased the seed deposited at the edge of the plot and further seed was deposited along the direction the forage was raked for removal. Passive seed distribution provides only limited dispersal of Italian ryegrass seed and is unlikely to allow uniform re-establishment by self-seeding.