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Effect of Cutting and Irrigation on Seed Yields of Interstate Sericea Lespedeza

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SINCE ITS RELEASE in 1969 *(3)*, Interstate sericea lespedeza has been widely planted in the Southeastern United States on highway rights-of-way and on other areas where an attractive, low growing perennial is needed for conservation. Unfortunately, seed supply has not been large enough to meet demand for the new variety.

Lack of rainfall during critical growth periods, a serious problem with many crops in the Southeast, has limited Interstate seed production. Although sericea can withstand relatively dry conditions, irrigation could be expected to increase seed yields in years of drought.

Sericea seed yields reported by sev-

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eral workers show wide variations. Unhulled seed yields were 400 to 600 pounds in Georgia (*1*) and 1,600 pounds per acre in Virginia (9). Yield of hulled seed was reported to range from 150 to 1,500 pounds in Tennessee (*8*).

Good sericea hay yields have been reported, ranging from 2 tons per acre when cut once a year at 12-inch height (*6*) to 5 tons when cut twice a year (*2,7*). In previous research at Auburn (4,6), cutting hay early in the season decreased seed yields. However, irrigation was found to increase seed production (*4*).

Objectives of this study were to determine the influence of cutting and irrigation on seed yields of Interstate sericea lespedeza.

EXPERIMENTAL PROCEDURE

Seed yield experiments were conducted during 1971-72 on 5-year-old stands of Interstate sericea on Lucedale fine sandy loam soil at the Foundation Seed Stocks Farm, Thorsby, Alabama. A large field of established sericea was necessary so seed could be harvested with a combine to duplicate farm conditions. The only field of adequate size available for this study was planted partly broadcast and partly in 27-inch rows.

The experimental area was divided into plots of 20 x 150 feet. There were four replicated plots — two broadcast and two in wide rows — for each irrigation and cutting treatment. A split-plot design was used. Seed were harvested from the following treatments:

(1) No hay cut — irrigated.

(2) Hay cut once when 12 to 15 inches tall — irrigated.

(3) No hay cut — not irrigated.

(4) Hay cut once when 12 to 15 inches tall — not irrigated.

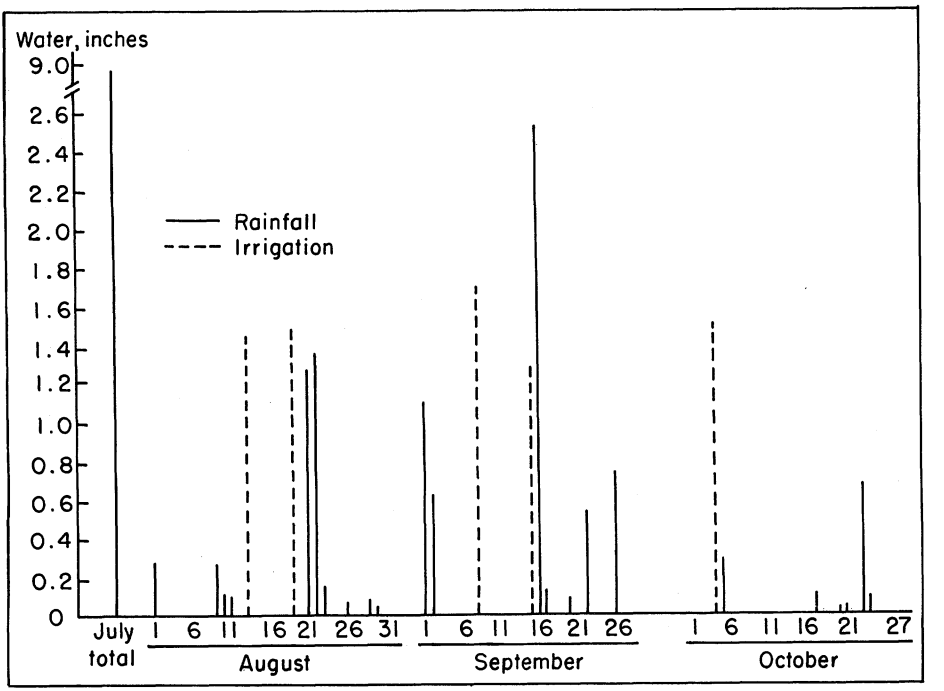

FIG. 1. Rainfall and supplemental irrigation from July until seed harvest in 1971. Amount of irrigation water is an average of four replications.

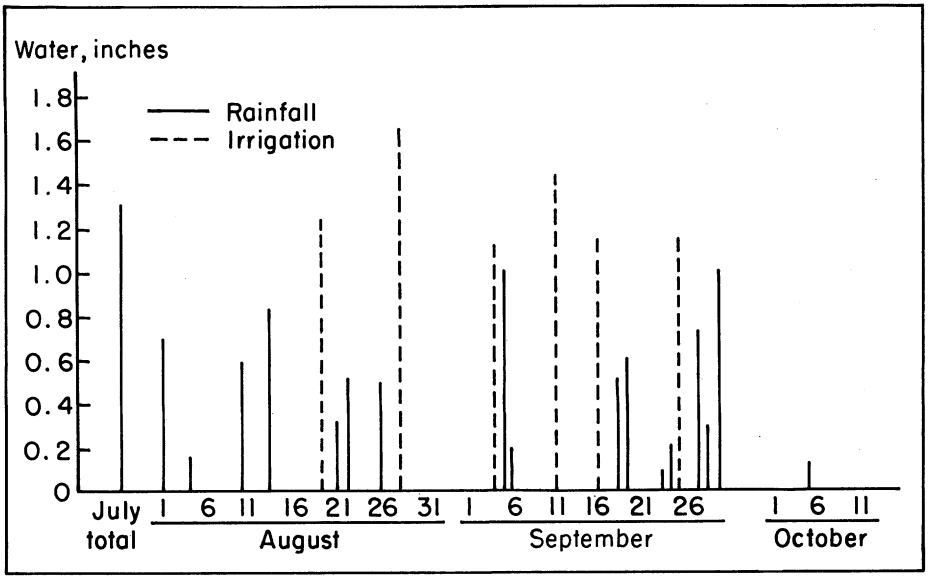

FIG. 2. Rainfall and supplemental irrigation from July until seed harvest in 1972. Amount of irrigation water is an average of four replications.

Seed from each plot were combine harvested in October each year, and yields are reported in pounds per acre of hulled, cleaned seed. To estimate seed loss during combining, small sub-plots in each plot were hand harvested just before combining in 1972. Thus, actual yields could be compared with combine-harvested yields to provide loss figures.

Irrigation was done during August and September each year, figures 1 and 2, with 50 per cent available moisture level set as the point at which water would be added. At field capacity, the average available water per foot of soil was 1.2 inches. Water loss under sericea is about 0.2 inch per day on this soil type (5). Therefore, if 1.5 inches of rain fell in 1 day, irrigation would be necessary approximately 7 days later if no more rain fell during this 7-day period. However, if the 1.5 inches were followed by 2 inches of rain 1 or 2 days later, much of the latter rainfall would run off. Nevertheless, the soil most likely would have reached field capacity. Thus, the 0.2 inch per day water-loss count would begin at 1.2 inches. The moisture would be sufficient for about 6 days, at which time supplemental irrigation again would be needed.

RESULTS AND DISCUSSION

Such weed species as fall panicum, prickly sida, crabgrass, ragweed, and signalgrass were abundant between rows on plots that were cut for hay, particularly in 1971 when there was more rainfall. In fact, weeds were already taller than sericea when irrigation treatments were begun on these plots in August 1971. The next summer was rather dry, and weeds were no taller than the sericea when 1972 irrigation treatments were begun. There was no appreciable weed competition on the uncut, wide-row or on the cut or uncut, broadcast-planted plots, Figure 3.

Combine-Harvested Seed Yields

Broadcast sericea that was neither cut nor irrigated produced 860 pounds of hulled, cleaned seed per acre in 1971 and 431 pounds in 1972, an average of 645 pounds, figures 4 and 5. As an

FIG. 3. Weed competition in Interstate sericea lespedeza varied according to treatment. Uncut wide row (lower photo, left) and cut wide row (lower photo, right) are contrasted with uncut broadcast (upper photo, left) and cut broadcast (upper photo, right). Photographed in mid-August, just after beginning of irrigation treatments.

average for the 2-year period, irrigation increased the yield of broadcast, uncut sericea by 33 per cent. During the dry season of 1972, the increase from irrigation of broadcast, uncut sericea was 74 per cent, or 317 pounds.

Generally, seed yields from broadcast sericea were higher than from wide-row sericea, figures 4 and 5. This higher yield is attributed to greater weed competition in wide-row sericea, Figure 3. Considering an average of both years, irrigation did not increase seed yields from wide-row sericea. During the dry year of 1972, however, irrigating uncut, wide-row sericea increased seed yields by 73 per cent. This was a 269-pound difference because of irrigation.

A single hay cutting each year in May reduced average seed yields of broadcast sericea from 751 to 340 pounds per acre, a 55 per cent decrease. On wide-row sericea the decrease amounted to 66 per cent, from 542 to 182 pounds per acre.

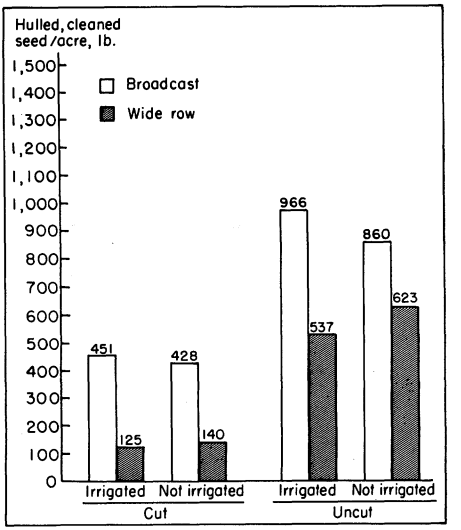

FIG. 4. Effects of cutting and irrigation on combine-harvested seed yields of Interstate sericea lespedeza in 1971 are illustrated here.

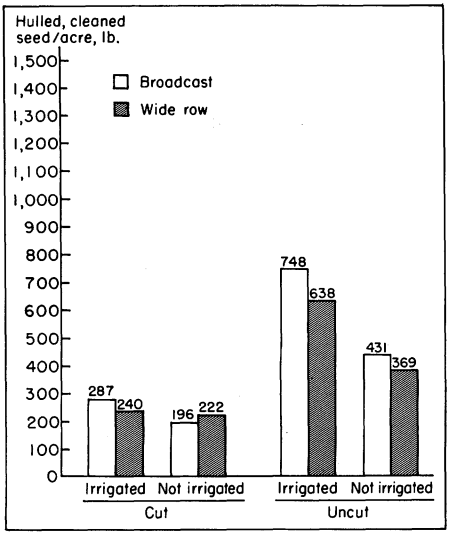

FIG. 5. Effects of cutting and irrigation on combine-harvested seed yields of Interstate sericea lespedeza in 1972 are illustrated here.

Hand-Harvested Seed Yields

Hand-harvested seed yields were excellent, Figure 6. Despite the dry summer of 1972, broadcast sericea that was not cut for hay produced 621 pounds per acre of hulled, cleaned seed without irrigation. Irrigation pushed this to 1,347 pounds, giving a 117 per cent increase from the irrigation. Wide-row sericea made higher seed yield than broadcast sericea when hand-harvested, except for the cut and irrigated treatment.

Results were different with combine-harvested sericea in 1972. More seed were harvested from broadcast than from wide-row sericea except for one treatment (cut, nonirrigated). This reversal was caused by weeds in the wide-row plots. On wide-row plots that were hand harvested, only sericea was cut and weeds between rows were left. With combine harvesting, however, all plant material (sericea plus weeds) was cut and forced through the combine. Many of the seed were lost as excessive plant material passed through the combine.

In irrigated plots (where weeds presented the greatest problem), hand-harvested, wide-row sericea produced 39 pounds more seed per acre than broadcast sericea, Figure 6. When combine harvested in 1972, however, wide-row sericea produced 79 fewer pounds of seed per acre than broadcast sericea, Figure 5. Approximately twice as much seed was produced on uncut, wide-row sericea when irrigated than if nonirrigated, (1,463 vs. 753 pounds per acre), Figure 6. Weed competition was much less on wide-row sericea that was uncut than on the cut treatment, Figure 3.

One hay cutting in May reduced seed yields considerably on both broadcast and wide-row sericea, Figure 6. Broadcast sericea left uncut (average of irrigated and nonirrigated) produced 984 pounds per acre of hulled, cleaned seed. When cut, however, broadcast sericea made only 309 pounds, a 675-pound yield reduction. Wide-row sericea suffered even more pronounced yield re-

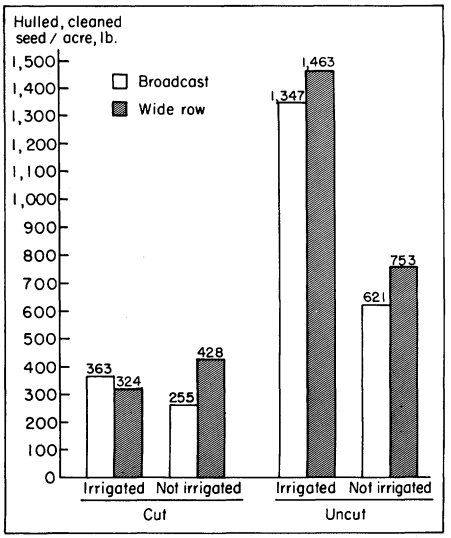

FIG. 6. Effects of cutting and irrigation on hand-harvested seed yields of Interstate sericea lespedeza in 1972 are illustrated here.

duction from cutting. Uncut sericea produced 1,108 pounds of seed while that cut yielded only 376 pounds, a decrease of 732 pounds. These data indicate that sericea in rows as wide as those in this experiment should not be cut for hay.

Considering all treatments in 1972 on both broadcast and wide-row sericea, an average of 391 pounds of hulled, cleaned seed was combine harvested, Figure 5. Hand-harvested sericea, however, produced an average of 694 pounds, Figure 6. This indicates that slightly more than half of the seed produced (56 per cent) were harvested by the combine. The remaining 44 per cent may be accounted for partially through shatter loss from the combine reel and cutter bar and inefficiency of the combine in separating seed from the remaining plant parts.

In 1972, hand harvest of nonirrigated, uncut, broadcast sericea produced 621 pounds of hulled, cleaned seed per acre, Figure 6. When combine harvested, yield was 431 pounds per acre of seed, Figure 5. This indicates that only 69 per cent of the seed actually produced were combined.

Forage dry matter yield from one hay cutting each May of the 2-year period averaged 3,000 pounds per acre.

Results of this study indicate that several factors are important in efforts to get maximum Interstate sericea seed yields.

(1) Broadcast plantings were less weedy than wide row sericea, and weed competition interferes with sericea seed harvest.

(2) Yield data indicate it would be more profitable to harvest Interstate for seed only. Hay from a May cutting would be much less valuable than seed that would be sacrificed by the hay cutting.

(3) Proper timing of seed harvest and combine efficiency also must be considered. Optimum seed harvest time in central Alabama is October 10 to 15.

(4) Results also indicate that irrigation can effectively increase seed yields during seasons of low rainfall or poor rainfall distribution. Droughty conditions such as prevailed in the summer of 1972 might be expected in 5 of 10 years in central Alabama (*10*).

SUMMARY

Cutting and irrigation treatments were applied to established broadcast and 27-inch row stands of Interstate sericea lespedeza to determine their influence on seed yields. Seed were both combine and hand harvested.

Irrigation increased 2-year average combine-harvested seed yields of uncut, broadcast sericea 211 pounds per acre (857 vs. 646 pounds) but had no effect on wide-row sericea. With well-distributed rainfall in 1971, there was no increase from irrigation on either broadcast or wide-row sericea. In 1972, however, rainfall was limited and irrigation increased combine-harvested seed yields of uncut sericea from 431 to 748 pounds per acre. Generally, combine-harvested seed yields were higher from broadcast than from wide-row sericea.

Irrigation more than doubled the hand-harvested seed yields from uncut, broadcast sericea. Production was 621 pounds per acre without irrigation and 1,347 when irrigated.

For the 2-year period, one hay cutting in May each year reduced combine-harvested seed yields of broadcast sericea from 751 to 340 pounds per acre; the reduction on wide-row sericea was from 542 to 182 pounds.

Hand-harvested yields showed that only about half of the seed actually produced in 1972 were gathered by the combine. The other half was lost through shatter loss from the combine reel and cutter bar and inefficiency of the combine in separating the seed from other plant material.

Forage yields from one hay cutting in May averaged 3,000 pounds of dry matter per acre during the 2 years.

Acknowledgments

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