TECHNICAL NOTES

Eurotia lanata Establishment Trials[1]

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Highlight

***Eurotia lanata* has been diminishing from the vast acreages once found throughout the west. Fattening and nutritious qualities, coupled with rapid growth even in an arid habitat, make it a valuable semi-shrub worthy of cultivation. Seeding trials during spring and fall 1964 near Laramie showed best results from the May 17 seeding date and 0.25-inch depth of seeding.**

Eurotia lanata, known as winterfat or whitesage, is important as livestock feed. It is of high nutritive value, good palatability, and grows rapidly in an arid habitat.

Most authors agree that in recent years winterfat has been retreating from its distribution over the western ranges. The reduction in numbers of this plant has caused a decrease in grazing capacity in many areas. Its high palatability has resulted in severe overgrazing to the point of its extinction in many areas. It is grazed to the roots wherever found (Hilton, 1941; Kinsinger and Strickler, 1961; May, 1963).

Reestablishment of this nutritive and palatable shrub would increase grazing capacities of many areas.

A seeding trial with *E. lanata* was conducted west of Laramie, Wyoming, to determine the most desirable time of planting and depth of seeding for establishment of this plant.

Methods

This study was conducted on a dryland portion of the Agronomy Farm of the University of Wyoming at Laramie, in 1964. The land had been summer fallowed for seven years. Precipitation for the year was 7.77 inches. Precipitation for the growing season from the first planting date to October 15 was only 3.74 inches.

The field was first disked, then leveled by a hand hoe and rake.

The *E. lanata* seed was collected from a golf course south of Pine Bluffs, Wyoming in November, 1963. It was cleaned at the Plant Materials Center in Bridger, Montana. Germination was tested in the Wyoming State Seed Laboratory shortly before each planting.

Seed was planted in two 10-foot rows, 30 inches apart and 15 inches from either edge in half of the plots. Fifty seeds were planted in each row, two inches apart and 0.25 inch deep. One hundred seeds were broadcast in the center 30-inch strip of the other 5x10-foot plots. The seeds were hand broadcast and raked into the soil. Three row and three broadcast plots were planted on each date: May 6, May 17, June 1, June 17, September 13, September 27, and October 15.

Plots were seeded June 1 and June 17 in rows to a depth of 0.5 and 0.75 inch, replicated three times. The plots were hand weeded and kept clean throughout the summer.

The number and height of plants that emerged were recorded. The growing plants were counted at the end of the first, second, third, and fourth month after each planting and again on October 15, in all plots.

Results

The germination of *E. lanata* seed at room temperature was 91%.

The first *E. lanata* plants appeared in the field 10 days after planting. A total of 306 plants emerged from 2400 seeds planted in all plots; 12.7% of those planted. A total of 203 plants emerged in the plots seeded in rows and 103 in the broadcast plots. There were 156 seedlings established in all plots on October 15, or 6.5% of the total seeds planted. There were 94 plants in the plots seeded in rows and 62 in the broadcast plots.

Thirty-nine plants were established in the plots planted May 6; 21 were in the rows and 18 in the broadcast plots. Sixty-nine plants were established on October 15, in all plots seeded May 17, 1964; 37 in the plots in which seed was planted at 0.25-inch depth and 32 in the broadcast plots. Twenty-nine plants were established in the plots planted June 1; 22 in the row plots and 7 in the broadcast plots. Nineteen plants were established in the plots planted June 17; 14 in the row plots and 5 in the broadcast plots (Table 1).

There were 36 plants in the six plots in which the seed was planted 0.25 inch deep, 25 in those planted at 0.5 inch, 17 at 0.75 inch and only 13 plants in the six broadcast plots (Fig. 1).

Total number of seedlings that emerged in the plots of the May 17 planting was significantly greater than for the other planting times.

Also the number of seedlings established in the May 17 plantings was significantly greater than in the other plantings.

The number of seedlings established in the rows planted 0.25 inch deep was significantly greater than in the broadcast trials.

There was no significant difference in height of the plants of the row or broadcast-planted plots on August 17 or October 15, 1964. Average plant height of the June 17 planting date was about 2 inches less

Table 1. Mean[1] number of *E. lanata* plants established on October 15, 1964.

Type of Planting	Date			
	May 6	May 17	June 1	June 17
Row[2]	7	11	7	5
Broadcast	6	16	2	2

[1] Mean determined from plants found in three 5 by 10 plots.
[2] Rows—seeds were planted one-fourth inch deep.

[1] *Published with approval of the Director, Wyoming Agricultural Experiment Station, as Journal Article 322.*

than the heights of the plants seeded at the other dates.

No emergence was noted in the three fall plantings until the spring of 1965.

Discussion and Conclusions

Seeds used in the trial had 91% germination. 12.7% of the seeds planted in the field emerged and half of these plants were well established on October 15, 1964. The extremely low precipitation during the growing season was undoubtedly responsible for the small number of plants that emerged and became established in the field. Precipitation for 1964 averaged about normal for the first four months. Precipitation for May was .58 inch lower than normal. June was .12 inch higher than normal. Precipitation in July was only .25 inch as compared to the normal 1.73 (Becker and Alyea, 1964). Precipitation for the growing season May 6 to October 15, was 3.74 inches. Total precipitation for the year was 3.42 inches below normal.

Hail and wind killed 63 of the 170 plants growing on June 21, 1964. Some of these plants would have become established had this not occurred.

Hilton (1941) and Eckert (1954) stated that germination and seedling establishment were both hampered by very high or low temperatures. This was true in this study as low temperatures were recorded during the early part of the planting period. The minimum temperature average for May was 36.4 F. The temperature dropped below freezing eight times during May. These low temperatures may have retarded the germination and seedling establishment.

The greatest number of plants emerged and became established in the May 17 planting. There was sufficient moisture and the soil was warm enough for germination and growth at this time.

The greater number of plants emerged and became established in the row plantings, with the greatest number at the 0.25-inch depth. Fewer plants were established in the rows planted 0.5 inch deep and the smallest number at 0.75 inch deep. Riedl (1958) and Telwar (1961) obtained good results from shallow plantings.

Seed was planted deep enough for moisture to be available at 0.25 inch.

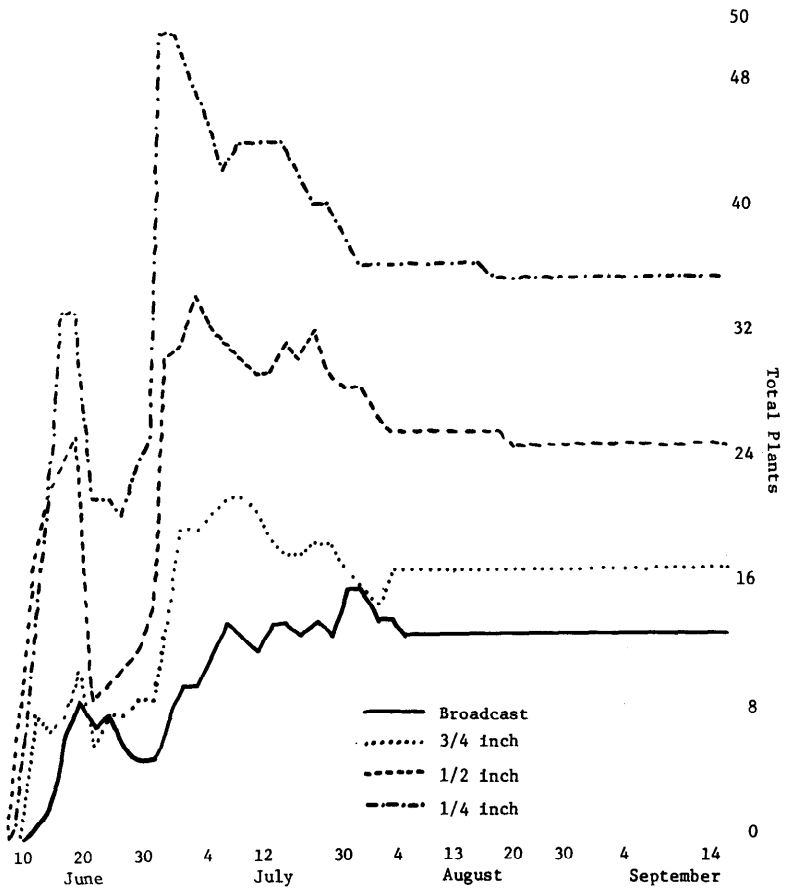

FIG. 1. Plant survival at various depths of seeding after emergence. Total plants from two planting dates; June 1 and June 17.

The broadcast seed was not planted this deep. It probably germinated and dried out or blew away. The 0.5-inch and 0.75-inch depths were too deep for satisfactory emergence. Many seedlings were not vigorous enough to penetrate this much soil.

Fall planting in the high plains is only occasionally feasible due to lack of available moisture at this time of year. Seeds did not germinate in the fall due to lack of moisture. High winds may have blown the seeds away during the dry winter. Germination of the seeds the following spring was considerably less than the year before. This was due to the considerable reduction in germination of *E. lanata* seed a year and two months after harvest date, as found by Hilton (1941) and the germination tests conducted with this study.

Very few plants grew the following spring in the trials planted in the fall of 1964. More seedlings appeared in the row plots than in the broadcast plots.

There was no significant difference in plant heights for the four dates of planting either in rows or broadcast. The average height of all 17 plantings was one inch as compared to the other spring plantings which were about three inches.

The year 1964 was poor for attempting this type of study. The year was plagued by extremely low precipitation and temperatures and a hailstorm in June did considerable damage to the plants. Even under these conditions, results were encouraging for establishment of *E. lanata* in large areas. The low percentage of *E. lanata* plants which became established would have increased the population of these plants more than 10,000/acre. This would greatly increase grazing capacity of many areas in the arid west in a few years.

LITERATURE CITED

BECKER, C. F., AND JOHN D. ALYEA. 1964. Precipitation probabilities in Wyoming. Wyo. Agr. Sta. Bul. 416. 97 p.

ECKERT, R. H., JR. 1954. A study of competition between whitesage and halogeton in Nevada. J. Range Manage. 7:223-225.

HILTON, J. W. 1941. Effects of certain micro-ecological factors on the germinability and early development of *Eurotia lanata*. Northwest Sci. 15:86-92.

KINSINGER, F. E., AND G. S. STRICKLER. 1961. Correlation of production with growth and ground cover of whitesage. J. Range Manage. 14:274-278.

MAY, MORTON. 1963. *Eurotia lanata* seeding trials. Report to the Bureau of Land Management. Univ. Wyoming Pub. 40 p.

RIEDL, W. A., K. H. ASSAY, AND R. L. LANG. 1958. Selection and improvement of *Eurotia lanata* (winterfat) and other species of salt desert areas. Wyo. Agr. Exp. Sta. Mimeo. Circ. 114.

TELWAR, G. M. 1961. Studies of *Eurotia lanata*. M.S. Thesis, Dep. Botany, Univ. Wyoming. 39 p.