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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

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Erosion Control
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June 7, 1938.

ARTIFICIAL RESEEDING ON ABANDONED FARM LANDS AND OTHER
ERODING AREAS IN MANITOU PARK, COLORADO.

Progress Report 1937



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OBJECT

To determine the best species and methods to use for reseeding denuded lands as an erosion control measure.

LOCATION AND SCOPE

The study is located in Twp. 10 and 11 S., R. 69 W., in Manitou Park, Colorado, near the Pike National Forest. The two phases of the study are as follows:

Phase No. 1.- Plots. For this phase 50 one-tenth acre plots were established in an abandoned field and were sown with smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), blue grama (*Bouteloua gracilis*) or yellow sweet clover (*Melilotus officinalis*). Two methods of soil treatment were studied. These treatments consisted of harrowing after sowing and harrowing before sowing. All sowings were made in triplicate at the rate of 20 pounds of seed per acre. Insufficient seed of blue grama grass was available to permit full replication.

Phase No. 2 - Gullies. For this phase a number of gullies were selected in abandoned fields and overgrazed pastures. Some of the gullies were sown with a 2-1-1 mixture by weight of sweet clover, smooth brome and crested wheatgrass while others were sown with sweet clover only. Areas selected represented all conditions of erosion from severe gullies to light sheet erosion. As a special feature an old field which had been used for growing potatoes for several years previous to the study was sown to sweet

clover and harrowed both before and after sowing. Other areas in this phase were given no treatment.

STATUS

The study began in April 1937, and initial field work was completed on both phases at that time. In September 1937, seedling counts were made on all plots as well as observations on the second phase of the study. Photographs were taken of both phases of the study.

RESULTS

Phase 1.— To determine the number of seedlings, each plot was divided into 20 strips 3.3 feet wide and 66 feet long and seedling counts were made on two of these strips selected at random. Each seedling counted was marked with a wire stake or nail pushed into the ground one inch north of the seedling. A summary of the seedling counts made in September 1937 is presented in table 1.

Table 1. Number of seedlings of each species for each treatment, Manitou Park, Colorado. (Counted on 10% of area.) September 1937.

Block No.	Sweet clover			Smooth brome			Crested wheat		
	Harrowed			Harrowed			Harrowed		
	After :Sowing	Before :sowing	None	After :sowing	Before :sowing	None	After :sowing	Before :sowing	None
1	3,055	6	9	0	0	0	0	0	0
2	201	1	11	0	0	0	1	0	0
3	500	38	47	0	0	0	0	4	2
Total	3,756	46	67	0	0	0	1	4	2

Note: No seedlings of blue grama were found.

The results of the seedling count show that yellowsweet clover is superior to any of the grasses for germination and establishment during the first season after planting. Also, as far as clover is concerned, harrowing after the seed is sown appears to induce better germination and establishment than where the plots were harrowed before sowing.

The general failure of the grasses was probably due to drought during the late spring and early summer and to competition from annual weeds and native grasses which grew on the area in great abundance. Many more grass seedlings were observed early in the season than were present when the count was made.

Phase 2.- Very good stands of sweet clover were found almost everywhere this species was sown in active gullies. The poorest stand occurred in the gullies on an abandoned field, but enough seedlings were present to indicate that barring winter killing, a good stand would develop. This area was sown with the 2-1-1 mixture of clover and grasses. No smooth brome seedlings and only a very few seedlings of crested wheat grass were found.

In an overgrazed pasture sown with the same mixture, dense stands of sweet clover seedlings had resulted, preference being shown for the raw mineral soils of the gullies. No seedlings of either grass species were found. At the time the observations were made germination of many of the clover seeds was just taking place. This fact was observed on all areas but was particularly noticeable in the pasture.

An examination of the Farm Security Administration picnic grounds, where several gully heads and slopes had been sown to sweet clover, revealed a dense stand of these seedlings. On this area a marked contrast

was observed between the north and south slopes of the gullies, the seedlings being more abundant on the moist north slopes.

In the abandoned potato field sown to sweet clover an exceptionally heavy stand of seedlings with unusual development had resulted. Many of the seedlings in this area attained a height of 8 to 10 inches whereas the usual height on other areas was 2 to 4 inches.

SUMMARY AND CONCLUSIONS

Preliminary conclusions indicate the superiority and adaptability of sweet clover as a species suitable for artificial reseeding on eroding areas in the Manitou Park area. Smooth brome, crested wheatgrass, and blue grama failed to germinate in sufficient quantity to indicate merit for reseeding purposes.

Definite conclusions regarding the suitability of sweet clover cannot be made until the study is completed.

RECOMMENDATIONS

It is recommended that establishment counts be made in the fall of 1938 as outlined in the working plan. It is highly probable that delayed germination may result in more seedlings being present at that time. It is also recommended that the experiment with the grasses be repeated, the sowing being made in the latter part of July or early in August as this is the beginning of the summer rainy season. As much of the erosion in this area is from abandoned fields which are easily worked with cultural implements, drilling as a method of sowing should also be tried to determine if covering the seed of the grasses somewhat deeper would result in better seedling stands.



Figure 1.

General view of the area in which the reseeding plots were located. The vegetation in the foreground consists of the dead stalks and leaves of the annual weeds and grasses of the preceeding year. April 1937.



Figure 2.

Close-up of a portion of a clover plot harrowed after sowing. Each nail or wire stake marks a seedling. September 1937.



Figure 3.

An abandoned potato patch on Manitou Experimental Forest which has been harrowed and sown with yellow sweet clover.



Figure 3.

Close-up of clover seedlings showing a more advanced stage of development. September 1937.



Figure 4.

Gully in the overgrazed pasture with clover seedlings growing in the bottom and along the sides. September 1937.



Figure 6.

The head of a gully on the picnic ground which has been sown with sweet clover. The seedlings are not very distinct but form a fairly dense stand over most of the area. September 1937.



Figure 7.

The bank of a gully on the picnic ground showing the dense stand of seedlings. These are especially noticeable in the foreground. September 1937.

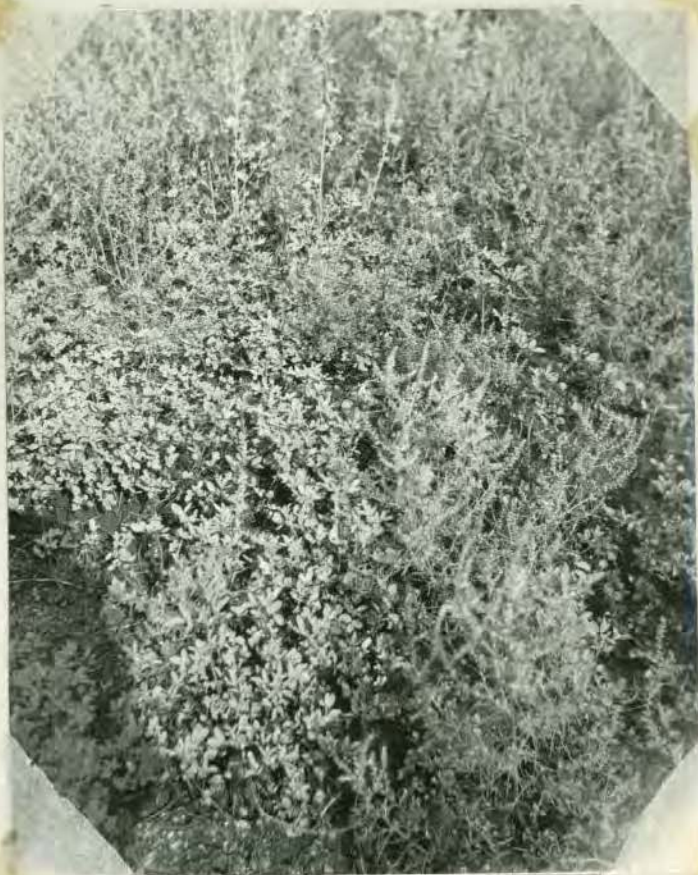


Figure 8.

A close-up view of the clover seedlings on the abandoned potato field showing the dense stand which has resulted from the sowings. September 1937.