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Report on Low Prairie of Grady Tract --1946.

H. C. Greene

The 1946 growing season was characterized by an extremely dry and generally cold spring, although there was an early warm spell. Fairly good rains fell in the middle of June, but this was followed by another dry spell of a month or more duration, so that precipitation remained at least 6 or 7 inches below normal throughout the summer. There were moderate rains in August and September. In contrast to the cold spring the fall was abnormally warm, but it is not probable that this condition had much effect one way or the other on native prairie species, many of which set seed and became senescent even earlier than usual.

The flowering of many species of native plants was profuse in 1946, apparently much greater than usual, and the set of seed on many plants was correspondingly great.

The Grady Tract suffered a bad fire in April 1946 which damaged or killed many trees. The prairie was burned over quickly, however, and there was no apparent damage. Thus, the prairie has been burned accidentally in two of the three years (1944 and 1946) in which this project has been in effect. Considerable ragweed (Ambrosia artemisiifolia) followed the burning, but it did not reach the profuse development of 1944, perhaps because of the dry season.

In contrast to the massive abundance of Gnaphalium polycephalum in 1945, there was a very small development in 1946. Whether this fluctuation is connected with the burn is not known.

An attempt was made to control Canada thistle in the area by spraying it with "Weedicide", but the application did not seem to be very successful, perhaps because it was made too late in the season. Most of the plants of Cirsium discolor were mowed down about the time

they came into flower, and by this means the 1946 seed supply was materially reduced. However, many first year rosettes were noted, so it will be necessary to repeat the mowing in 1947, and probably for several years thereafter.

The objectionably heavy growth of alsike which occurred in 1945 did not come up in 1946, or at any rate did not attain the height and vegetative profusion which characterized it in 1945.

The writer was fortunate to have Mr. R. S. Ellarson as an assistant, and a great deal more work was accomplished than would have otherwise been possible. In the course of the season 3486 mature plants and 1134 seedlings were set out on the area. The old fence at the west end of the prairie was taken down, and the well at the base of the hill on the northwest edge of the prairie was dug out and provided a convenient source of water for application to the transplants during the dry weather.

In 1946 the forty to the west of the prairie, which had been cropped for a number of years, was withdrawn from cultivation and, in the main, was planted to oaks. However, the prairie was extended about 500 or 600 feet westward into this area, to the edge of the oak plantings. The eastern third of this extension adjacent to the prairie had not been in cultivation and has growing naturally upon it white-fringed prairie orchids and Turk's cap lilies, as well as other desirable species. A rather large seeding project, described at the end of this report, was carried out in the westernmost part of the new extension.

The notes which follow concern the development and persistence of plantings made on the prairie in 1943, 1944, and 1945. The numerals in parentheses which follow the Latin plant name indicate into which one of the numbered subdivisions (see map with 1944 report) of the prairie the plants in question were moved. The common name of the plant is given in parentheses below the Latin name:-

A. Plants which were mature at the time of transplanting.

Andropogon furcatus (48,49)
(big bluestem)

These 1944 transplants, which did so poorly in 1945, developed and flowered vigorously in 1946, indicating that a year is required for establishment following transplanting.

Andropogon scoparius (59)
(little bluestem)

The single 1944 transplant, which could not even be located in 1945, came up and developed and flowered vigorously in 1946, indicating that, as in the case of big bluestem, a year is required for establishment.

Aster laevis (58,59)
(smooth aster)

A few of the 75 plants moved in 1945 showed good development, but most of those that could be found were stunted. The plants were probably set back because of having been pulled barerooted, or transplanted with too little soil about the roots.

Baptisia bracteata (40,58)
(cream wild-indigo)

There were two 1945 transplants. These plants came up, but did not thrive, particularly the large plant in Area 58.

Baptisia leucantha (58)
(white wild-indigo)

Two large rootstocks were transplanted in 1945. They were much damaged when dug, but nevertheless developed sizeable shoots, six or eight inches high, in 1946. This species is characterized by strong bud development on the crown, just below the soil surface.

Blephilia ciliata (23,134)
(blephilia)

Although these plants are supposed to be perennial, they are evidently short-lived. 1944 and 1945 transplants could not be found in 1946. However, a number of plants of this species were found growing naturally on the area (in 1946 additional *B. ciliata* was transplanted, this time with many small first-year rosettes which should develop further in 1947)

Cacalia suaveolens (16, 166)
(halberd-leaved Indian plantain)

The 1944 transplant in Area 16 grew vigorously, bloomed, and set seed in 1946. A number of plants developed flower stalks which were from plants which had been set out in 1945 as mere bare rootstocks. None were large, but apparently all these rootstocks sent up leaves in 1946.

Cacalia tuberosa (23,30,40,41,114,125,126)
(Indian plantain)

A total of 33 mature plants were set out in 1943-5. All showed good development and most flowered. It is of interest that seedlings were found in the vicinity of the 1943 and 1944 transplants, showing that they are successfully seeding in, since there is no other possible seed source.

Dodecatheon meadia (15)
(shooting star)

In general, it appeared that these 1944 plants were doing poorly, owing to an unfortunate choice of location.

Eryngium yuccifolium (22,31,40,58,87)
(rattlesnake master)

Six or seven of the 1944 transplants in Area 40 flowered in 1946, all three of the 1945 transplants in Area 87 did likewise, as well as two out of seven 1945 transplants in Area 22. Of 28 1945 transplants in Areas 31 and 58, none flowered in 1946, although all survived.

Geum triflorum (15,23,25,29)
(old man's beard)

All plants which survived
~~All plants which survived~~ the original transplanting appeared to be thriving in 1946, including the entire group of 13 large plants moved into Area 29 in 1945.

Habenaria leucophaea (126)
(white-fringed prairie orchid)

The single plant set out in 1945 did not come up in 1946, but since this species is known to be irregular in its growth and development, the plant has not yet been given up as lost.

Helianthus occidentalis (59)
(sunflower)

Most of the 130 clumps set out in 1945 produced leaves, and a few flowered, in 1946. It is anticipated that this hardy species will show its usual vigor in succeeding years.

Helianthus rigidus (59)
(sunflower)

No plants of this species could be found, although 78 rootstocks were set out. The plants were dug barerooted, a treatment evidently too drastic. It will be interesting to see whether any of these come up in 1947, but it is not expected that they will.

Liatris ligulistylis (15,23,25)
(blazing star)

The plants seem to be holding their own, although some are being encroached upon by the spread of Panicum virgatum. Of the 35 plants set out in 1943-44, about half could be found, and most of these bloomed in 1946. It is possible that some non-blooming plants may have been overlooked.

Liatris pycnostachya (30,40,124,125,126,127,134,135)
(gayfeather)

The colonies set out in 1944 in Areas 30 and 40 developed strongly and bloomed profusely in 1946. The 1945 transplants had considerably less blooming, but this was to be expected, since many of them were very small plants.

Liatris spherioidea (scariosa) (13,27,58,59,60)
(blazing star)

This species bloomed very well in 1946, in contrast to 1945. The sparse ground cover in the higher portion of the prairie, where this species is set out, should favor rapid seeding-in.

Lilium michiganense (40)
(Turk's cap lily)

A number of leafy shoots developed, more than in 1945, but as in 1945 the plants did not flower.

Lilium philadelphicum var. andinum (40)
(wood lily)

The two 1945 transplants did not grow in 1946. It seems possible that development may yet occur.

Lobelia cardinalis (40,143)
(cardinal flower)

None of the 12 plants set out in 1945 (basal leaf rosettes from 1945 flowering stalks) bloomed in 1946, and only one or two weak shoots could be found.

Parthenium integrifolium (40,58)
(American feverfew)

The two large transplants, one set out in 1944, the other in 1945, both bloomed in 1946. Thus, it appears that the season had more effect on blooming or lack of blooming than disturbance due to transplantation, for the 1945 transplant was not moved until late September, long after it would normally have bloomed.

Pentstemon digitalis (47,48,114)
(beardtongue)

This species seems to be adversely affected by transplanting. Only a few plants bloomed in 1946. However, some of the plants were rather small non-flowering rosettes at the time of digging, so they might not have flowered in 1946, even had they been undisturbed.

Phlox pilosa (22,23,125,126)
(prairie phlox)

Of 8 clumps set out in 1945 in Areas 22 and 23, five or six bloomed in 1946. Eight or ten plants out of 27 in Areas 125 and 126 bloomed in 1946. The others could not be found. Great differences in time of blooming were noted among these latter plants.

Polemonium reptans (22,41)
(Jacob's ladder)

Eight or ten of the 15 1944 transplants were observed in bloom in 1946

Prenanthes racemosa (40,125)
(marsh rattlesnake root)

Of the 5 plants set out in 1945 none flowered in 1946. The basal leaves of two of the plants in Area 125 were observed, but the other plants could not be found.

Silphium terebinthinaceum (42)
prairie dock)

The five small 1944 transplants showed considerable size increase over 1945, but none even approached flowering stature.

Solidago rigida (58,59)
(stiff goldenrod)

The one large blooming specimen which was moved in 1945, developed well and bloomed in 1946, although it was not quite as large as in 1945. None of the 18 small plants in Area 59 bloomed in 1946, although most of them were found.

Solidago speciosa (58,59)
(goldenrod)

This species appears not to be a suitable subject for transplanting. While both 1944 transplants and one or two of the 1945 ones were found, none seemed to be thriving.

Sorghastrum nutans (48,49)
(Indian grass)

Of the seven 1944 transplants which did so poorly in 1945, five were in vigorous flowering condition, and two in equally good vegetative development in 1946.

Valeriana ciliata (125)
(valerian)

Of six 1945 transplants only one could be located in 1946, and it was stunted. The roots were badly damaged when the plants were dug.

Zizia cordata (aptera)
(heartleaf Alexanders)

Evidently one of the best subjects for transplantation. Nearly all the twenty-two 1944 and 1945 transplants developed and flowered vigorously in 1946.

B. Plants which were seedlings at the time of setting out.

Astragalus canadensis (29)
(milk vetch)

The one plant set out in 1945 showed good growth in 1946, and should bloom in 1947.

Baptisia bracteata (31)
(cream wild-indigo)

The one plant set out in 1945 could not be located in 1946.

Baptisia leucantha (23,24,25,27,29,31,42,86,87)
(white wild-indigo)

Of the total of 47 seedlings set out in 1945 only a few could be located, but these plants are inconspicuous and it is highly probable that some were overlooked.

Echinacea pallida (42)
(pale coneflower)

It is believed that the majority of the 66 seedlings set out in 1945 survived. During the extreme dry conditions of spring and early summer of 1946 these small plants showed great resistance to wilting. It looks as though at least two more years will be required for them to reach flowering size.

Eryngium yuccifolium (31,58,86,87)
(rattlesnake master)

Several thriving seedlings were noted in Areas 31 and 58, but were not noted elsewhere.

Geum triflorum (22,38,45)
(old man's beard)

Most of the 1945 seedlings were located in good condition. They do not look as though they will develop into flowering specimens before 1948, however.

Helianthus occidentalis (29,58)
(sunflower)

All of the twenty-five 1945 seedlings did well and several plants flowered in 1946.

Helianthus rigidus (49,58)
(sunflower)

None of the 21 1945 seedlings could be located in 1946. Further search will be made in 1947, as it seems possible they were overlooked.

Kuhnia eupatorioides (16,17,27,29)
(false boneset)

None of the 66 seedlings set out in 1945 could be located in 1946. 54 of these were killed by frost within a couple of days after having been set out. The reason for the failure of the others is not known.

Parthenium integrifolium (10,17,31,40,48,86,87)
(American feverfew)

It is believed that most, if not all, the 74 1945 seedlings survived, although not all could be located. A few reached very considerable size.

Petalostemum purpureum (29,86,87)
(purple prairie clover)

None of the 6 seedlings in Area 29 could be located, but 2 out of 7 in Areas 86,87 were found growing vigorously.

Silphium laciniatum (22, 24,25,31,40,42,48)
(compass plant)

Of the 95 seedlings set out in 1945 a considerable number, but by no means all, were located in 1946. A sizeable percentage were damaged by frost at the time they were set out, and it is possible some of these did not survive.

Silphium terebinthinaceum (13,40,48,49,87)
(prairie dock)

Apparently most of the 92 seedlings, except perhaps the majority of those in Area 13, survived. The last mentioned were hard hit by frost when first set out. The plants in Area 40 did especially well.

Seedlings Set Out on Low Prairie in 1946.

A total of 1134 seedlings were planted during the season, mostly in June and early July. Most of the seed was collected in Wisconsin in the summer and fall of 1945, but some plants were grown from seed obtained from the Morton Arboretum, Lisle, Ill. and the New York Botanical Garden. The Wisconsin seed was stratified out-of-doors over winter according to the technique described in my report to the Arboretum Committee in 1945. The other seed was planted as received in flats in the greenhouse, without stratification, and nothing is known of its history.

Although many of the 1946 seedlings did extremely well after setting out, a detailed report on them is delayed pending their further development, if any, in 1947. The following tabulation lists the number of seedlings set out, the Latin name and, in parentheses following the name, the numbered subdivision (see map in 1944 report) of the prairie in which they were planted:

- 57 Allium cernuum (22,49,59)
- 2 Amorpha canescens (58)
- 29 Asclepias tuberosa (56)
- 75 Astragalus canadensis (58,68,69,70)
- 6 Baptisia australis (79)
- 33 Baptisia leucantha (42,68)
- 93 Cacalia atriplicifolia (9,14,24,62)
- 65 Cacalia suaveolens (166)
- 141 Cacalia tuberosa (115,127)
- 2 Coreopsis tripteris (14)

- 5 Grindelia squarrosa (55)
 13 Heliopsis helianthoides (70)
 7 Ruhhha eupatorioides (80)
 113 Liatris spherioidea (scariosa), late-blooming (70)
 20 Liatris spicata (82)
 77 Lilium philadelphicum var. andinum (29,30,41,49)
 27 Lobelia cardinalis (167)
 50 Lobelia siphilitica (158)
 41 Pentstemon hirsutus (44,57,59)
 24 Petalostemum candidum (48,68)
 6 Potentilla fruticosa (167)
 4 Silphium laciniatum (157)
 80 Silphium perfoliatum (53,166)
 60 Solidago rigida (68)
 39 Solidago speciosa (58,69)
 65 Sporobolus heterolepis (59)

Mature Plants Set Out on Low Prairie in 1946

A total of 3486 mature plants, from various sources, ^{were} ~~was~~ set out on the prairie in the season of 1946. Arboretum funds were used to buy 1000 corms of Liatris spicata from the Orchid Tree Nursery of Evans City, Pa. and to buy 100 plants of Asclepias tuberosa from the Toole Nursery at Baraboo, Wis.

- 13 Allium canadense (55)
 7 Allium stellatum (40)
 36 Andropogon furcatus (57,59,60,96,103,116)
 59 Andropogon scoparius (59,60)
 3 Asclepias sullivantii (114)
 100 Asclepias tuberosa (69,80)
 12 Aster ptarmicoides (58)
 34 Aster sericeus (58)
 29 Baptisia leucantha (48)

- 19 Blephilia ciliata (115)
- 11 Bromus kalmii (126)
- 14 Cacalia tuberosa (134)
- 20 Camassia esculenta (40, or 50?, 104)
- 1 Eryngium yuccifolium (59)
- 1 Gentiana puberula (59)
- 18 Geum triflorum (46)
- 13 Geum triflorum f. pallidum (48)
- 1 Habenaria clavellata (126)
- 10 Habenaria hyperborea (140)
- 4 Habenaria psycodes (W of old prairie, adjacent to 167)
- 2 Houstonia caerulea (sods with many plants each) (12,76)
- 3 Houstonia longifolia (clumps) (location uncertain, but known approx.)
- 26 Hypoxis hirsuta (40,115,126)
- 71 Liatris cylindracea (48,49,58)
- 13 Liatris ligulistylis (31)
- 315 Liatris pycnostachya (134, 142)
- 1319 Liatris spherioidea (scariosa) (59,68)
- 3 Liatris spherioidea - late-blooming-- (70)
- 1000 Liatris spicata (116,127)
- 3 Liatris squarrosa (60)
- 137 Lobelia cardinalis (143,167)
- 13 Lobelia siphilitica-clumps-(41,158)
- 8 Parthenium integrifolium (31)
- 13 Pedicularis canadensis-clumps-(59,115)
- 92 Phlox pilosa (14,40,115,117,125,126)
- 5 Polygala senega (115)
- 10 Solidago rigida (57,58,59,68)
- 25 Sorghastrum nutans (59,60)
- 2 Spiranthes sp. (prob. S. cernua) (126)

- 16 Spiranthes cernua var. ochroleuca (142)
 10 Sporobolus heterolepis-clumps- (58,59)
 6 Thaspium aureum (58)
 23 Viola pedata (68)
 21 Zigadenus elegans (126)
 1 Zizia aurea (115)
 17 Zizia cordata (115).

Tests and Studies of Methods of Obtaining Stands of Prairie
 Plants by Direct Seeding in the Field.

This work is thus far tentative in nature, but some fairly promising results have been obtained, and one large-scale seeding has been attempted. In the higher portions of the Grady Tract prairie the cover is very sparse and it should be an ideal seed bed for some of the hardy prairie species such as Liatris spherioidea (scariosa), Solidago rigida, Parthenium integrifolium, Eryngium yuccifolium, Andropogon furcatus, Andropogon scoparius, Sorghastrum nutans, Sporobolus heterolepis, etc. Plants to provide a source of seed have been set out and results, if any, should be apparent in a few years.

It is of interest that in 1946 seedlings of Cañalia tuberosa were found adjacent to plants which had been transplanted in flowering condition in 1943. Since none of these plants bloomed in 1944, and since the young plants were obviously more than a year old, they evidently started from seed shed in 1943. Small current year's seedlings were also found adjacent to 1944 transplants which flowered for the first time in 1945. These C. tuberosa plants are all in heavy sod in low spots, so it is plain that a dense ground cover does not preclude seeding in of this species where other conditions are favorable.

In the fall of 1945 a small series of test plots sowed with prairie grass seed, mainly Sorghastrum nutans, was set up. While these tests are not sufficiently far advanced for a complete report it seems worthwhile

to report that in a plot where alternate strips had been roughed-up with a rake, while those between had been left undisturbed, it was evident (from the characteristic autumnal coloration of Sorghastrum) that the grass had taken hold strongly in the disturbed strips, but very little, if at all, in the others, although the ground cover is not heavy in this area.

In October 1946, on the basis of the results just mentioned, in the NE portion of Area 71, six plots of variable size, the smallest about 35 sq. ft., the largest about 100 sq. ft., were vigorously raked in such a way as to break the soil surface without at the same time removing all the rather sparse grass cover, which consisted mostly of Poa compressa with a small admixture of red top and Panicum. After the raking the plots were all seeded rather heavily, using the same seed mixture in each case. The roughed-up soil surface was then lightly tamped down by means of merely walking over it. The seed mixture used:

Grasses

- Andropogon furcatus
- Andropogon scoparius
- Sorghastrum nutans
- Sporobolus heterolepis

Forbs

- | | |
|-------------------------------------|---------------------------------------|
| <u>Arnica canescens</u> | <u>Liatris spherioidea (scariosa)</u> |
| <u>Coreopsis palmata</u> | <u>Parthenium integrifolium</u> |
| <u>Dodecatheon meadia</u> | <u>Petalostemum candidum</u> |
| <u>Eryngium yuccifolium</u> | <u>Petalostemum purpureum</u> |
| <u>Helianthus occidentalis</u> | <u>Polytaenia nuttallii</u> |
| <u>Helianthus rigidus</u> | <u>Silphium integrifolium</u> |
| <u>Kuhnia eupatorioides</u> | <u>Silphium terebinthinaceum</u> |
| <u>Lathyrus venosus v. intonsus</u> | <u>Solidago rigida</u> |
| <u>Lepachys (Ratibida) pinnata</u> | |

These plots will be followed and reported on in subsequent years.

Attempt to Establish Representative Prairie Species by Large-scale Seeding on Land Just Withdrawn from Cultivation.

An irregular area, between 3 and 4 acres in extent, in the southwestern portion of the Grady Tract, btween the land planted to

oaks in September 1946 and west of the metal fence posts set out to indicate the eastern limits of the formerly cultivated area, was thoroughly disced, seeded in by broadcasting, and then dragged to cover the seed.

The seed used comprised that of six grasses and twenty-two forbs. An attempt was made to blanket the area with the grass seed, but that of the forbs was broadcast at random, except that Liatris pycnostachya was sown only in the lower spots, while, in general, plants characteristic of higher ground were not seeded on the low spots. Most of the grass seed was in mixtures and no attempt was made to broadcast it selectively.

The list of grasses used is as follows:

<u>Andropogon furcatus</u>	<u>Sorghastrum nutans</u>
<u>Andropogon scoparius</u>	<u>Sporobolus heterolepis</u>
* <u>Elymus canadensis</u>	* <u>Stipa spartea</u>

*Only small quantities of Elymus and Stipa were sown.

The list of forbs used is as follows:

<u>Amorpha canescens</u>	* <u>Liatris cylindracea</u>
<u>Anemone cylindrica</u>	<u>Liatris pycnostachya</u>
<u>Coleopsis palmata</u>	<u>Liatris spherioidea (scariosa)</u>
<u>Dodecatheon meadia</u>	<u>Parthenium integrifolium</u>
<u>Eryngium yuccifolium</u>	<u>Petalostemum candidum</u>
<u>Helianthus occidentalis</u>	<u>Petalostemum purpureum</u>
<u>Helianthus rigidus</u>	<u>Polytaenia nuttallii</u>
<u>Kunzia eupatorioides</u>	<u>Silphium integrifolium</u>
* <u>Lathyrus venosus v. intonsus</u>	<u>Silphium laciniatum</u>
<u>Lepachys (Ratibida) pinnata</u>	<u>Silphium terebinthinaceum</u>
<u>Lespedeza capitata</u>	<u>Solidago rigida</u>

*Only small quantities of Lathyrus and L. cylindracea were sown.

In the low spots the soil is black and peaty, while on the higher ground it is a yellowish-brown sandy clay. All of the area seeded had been plowed in the fall of 1945, but only the higher parts were put in oats, as the people who did the plowing evidently decided that the low spots would be too wet for agricultural operations in the spring. Although the portion which had been plowed, but not put in cultivation, was very rough the discing did a completely satisfactory

job of smoothing it. The cover of the non-cultivated part was very sparse, mostly ragweed (Ambrosia artemisiifolia). The portion which had been in cultivation was covered with oat stubble, and showed agricultural stragglers, such as alsike, red clover, timothy, etc., as well as various weeds, mostly quack and foxtail grass.

No further treatment of this area is contemplated, other than perhaps mowing it in the summer of 1947, if necessary to keep down the weeds to give the prairie species a better chance.

It is recognized that some of the representative prairie forms, e. g., the species of Baptisia, were not included (Baptisia in this vicinity failed to set seed in 1946), but it will be interesting to see whether such things come in as volunteers, and if so, how soon. At least most of the area concerned has been in intensive cultivation for a number of years and it seems safe to assume that there is little or no reserve of seed of native plants in the soil.

Seedbed of Silphium laciniatum

In October 1945 a seedbed 24 x 30 ft. was laid out in the NE corner of Area 105. To the west of this, and adjoining it, a small check plot 6 x 12 ft. was also staked out. In the large bed seed of Silphium laciniatum, collected a few days previously, was planted in rows individually, seed by seed, by means of inserting a knife blade in the soil, dropping a seed in the slit, and pressing the soil together. No count was made of the seed thus planted. The number was high since they were planted quite close together in 8 rows running lengthwise through the seedbed. In the small check plot seed was merely broadcast on the soil surface, and in greater concentration than the planted seed. In the summer of 1946 a considerable number (not counted) of seedlings was found in the planted bed, but none in the check area. While the percentage of germination and development was not high, in proportion

to the number of seeds planted, it was nevertheless sufficiently so to indicate that this is a labor-saving and relatively satisfactory method of establishing this handsome and desirable prairie species. (It is by no means certain that the final results have been ascertained regarding germination of the seed in this bed, for some may have been merely dormant in 1946).

In the fall of 1946, on the basis of the results just mentioned thousands of seeds of S. laciniatum were planted at random over the entire prairie area. It is not anticipated that any confusion will result from this, since the greenhouse-grown seedlings set out in 1945 have a large head start, and there is no natural source of seed in the Grady Tract.

Small broadcastings of seed of the following species (not in mixtures) were made in spots roughed up with a rake in Area 105, immediately south of the Silphium laciniatum seedbed:

Blephilia ciliata
Bromus kalmii
Geum triflorum
Pedicularis canadensis
Polygala senega
Zizia cordata (aptera)

Similar broadcastings of seed of the following species were made in Areas 59 & 60, near Stake 52S:

Acerates viridiflora var. lanceolata
Liatris cylindracea
Liatris squarrosa
Stipa spartea

A small amount of seed of Liatris ligulistylis was broadcast on the roughed-up soil surface in Area 31, adjacent to the 1946 plantings of this species.

Seed of Castilleja coccinea (yellow form), collected at Devils Lake, was scattered in an area about a yard square (June 27) in Area 127, 8-10 paces SE of Stake 121S, in direct line with the gate in the S fence.

Seed of Asclepias sullivantii, obtained on the Faville Prairie, near Lake Mills, was planted, October 7, 1946, in Areas 31, 115, and 116. The ground was slit with a knife and several seeds planted in each slit. In Area 42 a considerable amount of seed was broadcast in a rather dry spot where the ground cover is very sparse.

On June 27, 1946 seed of Lupinus perennis was collected and scattered in six or seven places in Areas 45, 55, 65, and 77, all very sandy. Although a fairly good rain followed it was not sufficient to foster germination, and was preceded and succeeded by extremely dry conditions. In 1945 seedlings of this species were obtained in Area 44 from seed that had been scattered in 1944, so far as known, although the writer had not supposed Lupinus perennis seed remained viable for this long a period.

Seed of the annual Froelichia floridana was collected at Arena, Iowa Co. in October 1945 and broadcast in the sandy NE corner of the prairie. A dozen or more small plants were observed in October 1946, not a large number in view of the amount of seed broadcast. Presumably the 1945 seed of this annual will retain its viability for more than one year. Hence, more plants can probably be expected from that seeding, if not from the 1946 crop.

In October 1945 seed was broadcast in the very sandy Area 45 which is characterized by comparatively little ground cover, consisting mainly of some bunch grasses and, in the fall, a fairly dense stand of annual Aristida. The western 1/5 of the area was seeded with a mixture of Andropogon furcatus, Andropogon scoparius, Sorghastrum nutans, and Liatris spherioidea (scariosa). In the central part a mixture of A. furcatus and S. nutans was used, mostly the latter, while the eastern 1/5 was seeded with A. furcatus alone. No results from this seeding were detected in 1946.

In October 1945 small seedbeds were established in the abandoned prairie plant nursery on the old prairie (between the Seminole Highway and the Arboretum Administration Buildings). These beds were made on bare soil from which specimen plants had been recently removed. The purpose was to obtain seedlings, with a minimum of difficulty, for transplanting in 1946. The seeds used were those of Astragalus canadensis, Baptisia leucantha, Petalostemum candidum, and Solidago rigida. All were a success, except the Astragalus, although both scarified and non-scarified seed of it had been used. Details as to numbers of seedlings transplanted are found elsewhere in this report.

Baptisia australis seedlings were obtained after overwintering the seed in a can of soil. The can was temporarily forgotten, and in the course of the first warm spring days the seed, which was three years old, germinated quite profusely. The germinated seeds were planted at once on the prairie and half a dozen thrifty seedlings survived.

On April 11, 1946 non-scarified seed of Astragalus canadensis was scattered on the roughed-up soil surface adjacent to large imbedded boulder, 10 paces NE of Stake 61S in Area 58. This seed had been overwintered in the cold, but not stratified.

Likewise on April 11, 1946 seed of Cacalia atriplicifolia was scattered on the roughed-up soil surface adjacent to another similar boulder, almost directly 9 paces N of Stake 61S. In both cases the soil was tamped down following the seeding.

On April 23, 1946 seed of Sorghastrum nutans, collected in 1945, was broadcast in an exposed area, about 25-30 feet east of the end of the line of willows bordering the large ditch in the SE portion of the prairie.

Submitted by

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Dept. of Botany
November, 1946.

Studies on the Establishment of a Prairie Flora.

This is a long-range project, first formally undertaken in 1944. It is being carried out in the Grady Tract in the flat, unwooded portion immediately north of the C. & N. W. R. R. right-of-way and the oak opening some 800 feet to the north. In 1946 the area was extended westward about 600 or 700 feet to the edge of the oak plantings made in the same year. The east line fence of the Grady Tract marks the easternmost limit of the prairie.

Studies have included an intensive survey of the cover of this tract, undertaken in the summer of 1944, transplantation and further development of mature prairie species, obtained from various sources, and the growth and development of seedlings of prairie species in the greenhouse, and their subsequent behavior after transplantation to the prairie. Studies are also being made of the seeding in of prairie species under various conditions. In the fall of 1946 several acres in the westward extension were seeded to about 20 prairie species, and a number of smaller seeding studies are being made.

Since the initiation of the project 7033 mature plants and seedlings have been set out in this area. Of these 5316 were mature plants, and 1717 were seedlings. Full data is available as to the location of these plants and, as was done in 1944 and 1945, it is planned to submit for 1946 a detailed report to the Director of the Arboretum.

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