Reseeding “Go-Back” Land in
The Flint Hills of Kansas

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Highlight
Three sorghum types were com-
pared as mulches for seeding 12 na-
tive species and varieties in “go-
back” land in the Kansas Flint Hills.
Significant differences in seedling
establishment were found among the
species and varieties, but type of
sorghum mulch had no effect.

Much land in the Kansas Flint
Hills, once cultivated, is now being
allowed to “go-back” to grassland.
Such areas have shown relatively
slow secondary succession and after
many years still contain a high per-
centage of weedy, unpalatable, and
unproductive plants. Forage produc-
tion for livestock is, therefore, far
below potential. Lack of seed source
has often been mentioned as a deter-
rent in secondary succession in these
areas.

The possibility of introducing key
species by reseeding was studied on
the John Simpson Ranch in Geary
County near Junction City, Kansas.
This study was to determine the effect
of different stubble mulches on seedling establishment of certain
reseeded native prairie species and
to determine the relative ease of es-
tablishing native species and vari-
eties.

Literature Review
Savage and Runyon (1937) found
the time required for the more de-
sirable grasses to reclaim abandoned
fields fully in the central and south-
ern Great Plains region varied from
25 to 40 years. In the Colorado mixed
prairie region, abandoned cropland
returns to climax by natural succes-
sion in 10 to 20 years (Costello,
1944).

The rate of natural revegetation
following cultivation is affected by
many factors. Savage and Runyon
(1937) listed previous cultivation,
management of adjacent fields, graz-
ing intensity, proximity of tilled
fields and pasture lands, topography,
slope, and the type of soil among
the chief factors that affect rate of
secondary succession.

Use of stubble mulch has long
been recognized as necessary in re-
seeding abandoned cropland in the
central Great Plains (Franzke and
Hume, 1942; Staten, 1943). A seed-
bed protected by stubble mulch has
distinct advantages over a weed-
free, cultivated one. Stubble cover
aids in controlling wind and water
erosion, reducing surface evapor-
tion, and preventing soil crust ing
(Pearse et al., 1948). A heavy mulch
crop in seedings at Hays and Man-
hattan, Kansas, helped in keeping
soil temperatures down during the
warmest period of the day and in re-
taining moisture in the seed zone
for significantly longer periods
(Lauchbaugh and Anderson, 1963).

Dudley and Holt (1965), in their
work on the Grand Prairie of Texas,
showed also that some species were
more easily established than others.
Among those relatively easy to es-
tablish were sideoats grama (Botte-
loua curtipendula (Michx.) Torr.)
and blue panicum (Panicum anti-
dotale Retz.).

Differences in type of sorghum
used as stubble mulches at Hays and
Manhattan, Kansas, had no signifi-
cant effect on seedling establishment
(Lauchbaugh and Anderson, 1963).

Methods
The site selected for reseeding was
a clay upland range that previously
had been cultivated until it was
abandoned in the 1930's. Vegetation
in the area consisted largely of
short-lived perennial and annual
grasses and a variety of forbs. The
vegetation was not at or near climax.

The reseeding was done in three
different prepared stubble mulches:
1. Forage sorghum (Sorghum
vulgare Pers.).
2. Grain sorghum (S. vulgare
Pers.).
3. Sudangrass (S. vulgare var.
sudanses Hitchc.).

The stubble-mulch species were
sown with a grain drill at heavy
rates in mid-summer 1962, late
enough to prevent heading and thus
keep down competition with a re-
seeded species by a volunteer crop
the following year—a problem
pointed out by Lauchbaugh and

Eleven native grasses and one na-
tive legume were planted March 28,
1963, with one species per 20-foot
row. Rows were 1 foot apart, and 12
rows comprised a replication. Five
replications, with the 12 species ran-
domized within each replication,
were planted in each of the three
established stubble mulch residues.
Seeding was done with a 6-row grass
drill modified for experimental use.
The drilling mechanism consisted of
flat, double-coultor furrow openers
with depth bands 1 inch from the
cutting edge followed by spring-
loaded, rubber-tired press wheels.
The seeds were distributed by a
rubber V-belt dropping mechanism.
Seed rates were adjusted to give
approximately 25 pure, live seeds
per foot of row.

The species and varieties planted
were:
1. Little bluestem; KG-1580 (An-
dropogon scoparius Michx.).
2. Kaw big bluestem; KG-1579 (A.
gerardi Vitanm)
3. Indiangrass; 44-clonc Kansas
Agr. Expt. Sta. synthetic (Sor-
gustrum nutans (L.) Nash).
4. Indiangrass; 8-clonc Kansas
5. Indiangrass; 20-clonc Kansas
6. El Reno sideoats grama; KG-
482.
7. Block E sideoats grama; U. S.
Southern Great Plains Field
selection.
8. Blue grama; PM-K-206 (Bou-
teloua gracilis (H.B.K.) Lag. x
Stbud.).
9. Illinois bundleflower; KL-20
(Desmamnthus illinoensis
(Michx.) MacM.).
10. Barton western wheatgrass;
KG-402 (Agropyron smithii
Rydb.).
11. Blackwell switchgrass; KG-208
(Panicum virgatum L.).

To determine seedling establish-
ment, two randomly placed 1-foot
samples were taken in each row
September 5, 1963, at the close of
the first growing season. Number of
seedlings was counted, and each
sample coded as follows in the field
on the basis of one plant per inch
comprising a 100% stand: (1) 80-
100%, (2) 60-79%, (3) 40-59%, (4)
20-39%, (5) 1-19%, (6) 0%.
The amount of residue present from the stubble mulch crops was determined by clipping 10 randomly placed 4.3 sq. ft. plots in each of the mulches December 29, 1962, and April 4, 1963. The experiment was analyzed as a split plot with the different stubble mulches as main plots and the different species and varieties, subplots. LSD comparisons and Duncan's New Multiple Range Tests were applied to the various means.

Results and Discussion

Effects of the different stubble mulches on seedling establishment were not significantly different, although amount of mulch residue present at both sampling dates differed significantly. Significantly more residue was present both December 29, 1962, and April 4, 1963, in grain sorghum than in either forage sorghum or sudangrass plots. Forage sorghum and sudangrass residue present April 4, 1963, was significantly less than on December 29, 1962, but differences in grain sorghum residue between the two dates were not significant. Much of the forage sorghum and sudangrass residue was blown off by wind, but grain sorghum was not affected appreciably by the wind.

Seedling establishment of the various species and varieties differed significantly at the close of the first growing season (Table 1). Sideoats grama and indiangrass had the best stands in all three mulches. Blue grama, western wheatgrass, little bluestem, and lowland switchgrass had poorest stands. The species and varieties performed the same generally in all three mulches.

Seedling establishment on this upland site for Kanlow switchgrass, a lowland variety, was poorer than for Blackwell switchgrass, an upland variety (Table 1). Seedling establishment in the first growing season constitute an excellent stand.

During the first growing season, buffalobur nightshade (Solanum rostratum Dunal) became very abundant in the reseeded area, but almost completely disappeared the following year. The same phenomenon was observed in a nearby plot similarly reseeded. It was observed that other forbs also decreased the second growing season after seeding.

Summary

Type of stubble mulch residue in reseeding "go-back" land had no significant effect on seedling establishment. Seedling establishment differed significantly by species and varieties. Forage sorghum and 8-clone indiangrass and lowest in little bluestem, Kanlow switchgrass, Barton western wheatgrass, and blue grama. Even though the seeding tests were in a dry year, excellent stands were obtained.

LITERATURE CITED


<table>
<thead>
<tr>
<th>Table 1. A comparison of seedling stands of indicated plants.</th>
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<tr>
<td><strong>Entries</strong></td>
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<tr>
<td>-------------</td>
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<tr>
<td>8-clone indiangrass</td>
</tr>
<tr>
<td>Block E sideoats grama</td>
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<tr>
<td>20-clone indiangrass</td>
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<tr>
<td>El Reno sideoats grama</td>
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<tr>
<td>Kaw big bluestem</td>
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<tr>
<td>44-clone indiangrass</td>
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<td>Blackwell switchgrass</td>
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<tr>
<td>Illinois bundleflower</td>
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<tr>
<td>Blue grama</td>
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<tr>
<td>Kanlow switchgrass</td>
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<td>Little bluestem</td>
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<td>Barton western wheatgrass</td>
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<td><strong>Forage sorghum</strong></td>
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<td><strong>Grain sorghum</strong></td>
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<td><strong>Sudangrass</strong></td>
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1 Means coded as follows: 1 = 80-100% stand; 2 = 60-79%; 3 = 40-59%; 4 = 20-39%; 5 = 1-19%; 6 = 0%, where 1 plant per inch = 100% stand.

* .05 level.