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Annual Lespedezas
in North Carolina

Annual lespedezas cover a considerable acreage in North Carolina and have a variety of uses. About one-half million acres are cut for hay each year, this being about half the total hay acreage harvested in the state. In addition to the hay harvested, North Carolina is one of the largest producers of seed—harvesting around 150,000 acres each year. Annual lespedeza provide considerable supplementary grazing in the summer and fall, and are also used as soil conserving and soil improving crops.

VARIE TIES

Common, Kobe and Korean have been the standard varieties for many years. There are two new varieties now being recommended, Rowan and Climax. A description of these varieties follows:

Common

Common lespedeza has been volunteering in the state for many years and was the first variety identified and used in the Southeast. It is a low grading variety and at present Common is seldom sown for hay or pasture, being replaced by taller growing and more productive varieties. Common seed are scarce.

Kobe

Kobe lespedeza is somewhat similar to Common, but has larger leaves, stems and seed. It is the latest maturing of the presently available varieties and is especially recommended on the nematode-free soils of the Tidewater and Coastal Plain section of the state. Kobe is also well adapted to the Piedmont section. In the high Mountain area, it is often killed by frost before the seed is mature.

Korean

Korean lespedeza is quite different in appearance and habit from Common and Kobe. It is both earlier to start growing in the spring and to mature in the fall. The leaflets are broader and the seed is borne mostly at the tips of the branches and not along the stem as in Kobe and Common. Korean is a relatively heavy producer of seed which can be combined easily.

Korean is better adapted to the northern and western parts of the state. Korean and Kobe overlap in the Piedmont section of the state.
Two new varieties of Korean lespezea are now available in the state and may eventually replace the old line parent strain of Korean. Both varieties have appeared promising in North Carolina and in a series of tests in seven states.

Table 1. Average Dry Hay Yields in Tons Per Acre for Four Lespezea Varieties Tested in Seven States.*

<table>
<thead>
<tr>
<th>State</th>
<th>No. of Tests</th>
<th>Variety</th>
<th>Rowan</th>
<th>Climax</th>
<th>Korean</th>
<th>Kobe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia</td>
<td>3</td>
<td></td>
<td>.83</td>
<td>.92</td>
<td>.64</td>
<td>.84</td>
</tr>
<tr>
<td>Maryland</td>
<td>5</td>
<td></td>
<td>1.74</td>
<td>1.71</td>
<td>1.54</td>
<td>1.54</td>
</tr>
<tr>
<td>Mississippi</td>
<td>4</td>
<td></td>
<td>2.29</td>
<td>2.49</td>
<td>1.80</td>
<td>1.92</td>
</tr>
<tr>
<td>Missouri</td>
<td>7</td>
<td></td>
<td>1.87</td>
<td>2.01</td>
<td>1.42</td>
<td>1.78</td>
</tr>
<tr>
<td>North Carolina*</td>
<td>5</td>
<td></td>
<td>1.89</td>
<td>1.77</td>
<td>1.52</td>
<td>1.55</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>6</td>
<td></td>
<td>1.54</td>
<td>1.65</td>
<td>1.28</td>
<td>1.55</td>
</tr>
<tr>
<td>South Carolina</td>
<td>3</td>
<td>Average</td>
<td>1.86</td>
<td>1.89</td>
<td>1.63</td>
<td>1.60</td>
</tr>
</tbody>
</table>

*Data obtained from report entitled, "1952 Annual Report of the Results of the Uniform Annual Lespezea Variety Tests". Three additional tests from North Carolina have been included in the original table. Appreciation is expressed to workers in other states who conducted the tests, and to Mr. P. R. Henson, U. S. Department of Agriculture, who compiled the data.

**Raleigh, McCullers and Statesville. Does not include tests on heavily infested nematode soils, nor in the main Kobe area.

Rowan

Rowan is a new variety released by the North Carolina Agricultural Experiment Station in cooperation with the U. S. Depart-

Table 2. Relative Susceptibility of Rowan, Korean and Kobe Lespezea to Root-Knot Nematode Species, Based on the Number of Galls on the Roots.

<table>
<thead>
<tr>
<th>Species of Meloidogyne (Root-Knot Nematode)</th>
<th>Degrees of Root-Knot Susceptibility*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rowan</td>
</tr>
<tr>
<td>M. arenaria</td>
<td>66.6</td>
</tr>
<tr>
<td>M. hapla</td>
<td>95.8</td>
</tr>
<tr>
<td>M. javanica</td>
<td>71.4</td>
</tr>
<tr>
<td>*M. incognita var. acrita</td>
<td>13.1</td>
</tr>
<tr>
<td>*M. incognita var. acrita</td>
<td>14.7</td>
</tr>
</tbody>
</table>

*O = no galls and highly resistant, 100 = severely galled and very susceptible.

* The two most common species of root-knot nematode in North Carolina.
ment of Agriculture. It is a new, high-yielding variety of Korean lespedeza moderately resistant to two most common forms of root-knot nematodes (*Meloidogyne incognita* and *M. incognita var acrita*). See Table 2. It also has resistance to powdery mildew. In North Carolina, its superior yield has been particularly striking on nematode-infested soils. See Table 3. In nematode-free soils, differences between Rowan and Korean have been less striking; on these soils Rowan yields 5 to 20 per cent more.

**Table 3.** Dry Hay Yields in Tons Per Acre for Rowan and Two Susceptible Varieties Grown at Five Locations in North Carolina on Soils Differing in Degree of Root-Knot Nematode Infestation.

<table>
<thead>
<tr>
<th>Variety</th>
<th><strong>Heavy</strong></th>
<th><strong>Moderately heavy</strong></th>
<th><strong>Light</strong></th>
<th><strong>Absent</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Willard</td>
<td>Summerfield</td>
<td>Creedmoor</td>
<td>McCullers</td>
</tr>
<tr>
<td>Rowan</td>
<td>0.96</td>
<td>1.34</td>
<td>1.95</td>
<td>2.37</td>
</tr>
<tr>
<td>Korean</td>
<td>0.27</td>
<td>0.16</td>
<td>0.67</td>
<td>2.01</td>
</tr>
<tr>
<td>Kobe</td>
<td>0.53</td>
<td>0.37</td>
<td>0.84</td>
<td>2.08</td>
</tr>
</tbody>
</table>

Rowan is recommended throughout the area where Korean is now grown and in the Kobe belts where nematodes are a problem. The growing season, growth habits, and seed of Rowan are similar to Korean. Rowan seed yields are some higher (Table 5).

**Climax**

Climax is another improved variety of the Korean type which promises to boost lespedeza yields in the state. Climax is adapted to the same general area as Korean. It is taller and more upright than Rowan, but it is susceptible to root-knot nematodes. Seed yields are somewhat less than for Korean and Rowan. Climax is about two weeks later maturing than Korean and three weeks earlier than Kobe.

This difference in date of maturity of Climax seems to offer several advantages. (1) It would allow staggering of hay-making operations. (2) In the northern part of the Piedmont, it would delay the hay-making until after tobacco harvest; and (3) it would allow an extension of the grazing period from lespedeza by using the varieties of different maturity dates.

**HOW TO GROW LESPEDEZA**

**Soils and Fertilizers**

You can grow annual lespedezas on most North Carolina soils except very dry, sandy ones. Lespedeza will often tolerate a low
lime and fertility level better than most of the other forage legumes. However, without proper treatment this plant will further exhaust the soil resulting in lower and lower yields. The following table illustrates this with lime:

<table>
<thead>
<tr>
<th>Year</th>
<th>Fertilizer and Lime</th>
<th>Fertilizer, no Lime</th>
</tr>
</thead>
<tbody>
<tr>
<td>1945</td>
<td>2074</td>
<td>2085</td>
</tr>
<tr>
<td>1946</td>
<td>3010</td>
<td>2266</td>
</tr>
<tr>
<td>1947</td>
<td>3293</td>
<td>1528</td>
</tr>
</tbody>
</table>

Lime and fertilizer had no effect the first year, but became more essential each succeeding year. In fact, the untreated soil would no longer support a stand after the third year.

Lespedeza is an excellent forage and soil improving crop, but the nutrients removed by it must be replaced by a good liming and fertilization program.

A soil test is always good business in determining how to lime and fertilize any crop. On soils not previously limed we recommend one to two tons as being sufficient for lespedeza. In the Piedmont, where lespedeza is grown following well fertilized small grains no more fertilizer is needed the first year. In the Coastal Plain 75 lbs. of muriate of potash should be added the first year. The second year’s lespedeza crop should receive 300 to 400 pounds of 0-14-14 fertilizer per acre especially where hay is removed.

Seeding
Kobe, Rowan, Climax, Korean and Common lespedeza are summer annuals and are seeded in late winter and early spring.

They can be overseeded in small grain successfully, when the soil is usually moist and loose on top. However, drilling is quite satisfactory and will require less seed.

Annual lespedezas volunteer freely if the seed is allowed to mature and the soil it not disturbed. Following a hay crop cut on time, there is normally enough seed for a good volunteer stand the next year.

Due to a build-up of weeds, lespedeza is usually not used as a volunteer crop more than one or two years.

While it is not necessary to cover the seed, some loose dirt on the surface is advisable. Therefore, when seeding on a packed or hard surface, such as an old pasture, where the perennial legume has gone out, it would be better to scarify the surface with a disk or some such implement. This should be done before sowing the seed.

The rates on the back page are for broadcast seeding. The rates can be reduced by one-third if drilled. Inoculation is not believed necessary for most of the North Carolina soils.

USES

Hay
Lespedeza makes a high quality hay and is easy to cure. However, time of cutting is important. Generally, lespedeza should be cut when the plant reaches a height of 8 to 12 inches, when it begins to shed leaves, or blooms, whichever occurs first. It can usually be cut after dew is off in the morning and put up in the afternoon during clear, dry weather. During a good growing season, hay cut early will allow a second crop for seed or grazing. In lespedeza as in most other hay crops, the leaves contain most of the feed value.

Seed
Seed yields vary with the variety, the Korean type generally yielding more than Kobe (Table 5). It is important to harvest the seed crop as soon as the seed pods turn brown or immediately after the first killing frost, whichever occurs first. The seed begins to shatter soon after ripening. Tests on the North Carolina Experiment Station showed that the seed yields of Korean following winter wheat dropped from 540 to 254 pounds per acre when harvesting was delayed three weeks. A 50 per cent reduction in the yield of Kobe likewise occurred when the seed was not harvested until three weeks after it was mature. In these experiments, Korean was mature about October 12, Kobe about November 9.
A corn, small grain, lespedeza rotation is used on many farms. In such rotations lespedeza is a good soil improving crop, especially where only seed are harvested. Where hay is removed, it is still a soil improver if proper mineral fertilizers are added. In one experiment in North Carolina, lespedeza was grown for four years and harvested for hay each year. The lespedeza was then plowed and followed with corn. The non-lespedeza plot produced 25 bushels of corn per acre; the lespedeza plots produced 48 bushels per acre with no additional nitrogen in either case.

The Two Kinds of Flowers and Young Pods (Seeds) from these Flowers in Korean Lespedeza

Lespedeza has two kinds of flowers. First, there is the showy flower which can be easily seen (Fig. 1). The second type (Fig. 3) is the tiny, closed (cleistogamous) flower which is usually formed during cooler weather. The tiny, closed flower is about 1/10 as long as the showy one and has no showy petals. Both types of flowers produce seeds (Fig. 2 & 4). Young seed pods from the closed flowers usually can be identified by the old flower parts which form a temporary “cap” on the tip of the pod (Fig. 4). The fact that the seed crop may come entirely from the closed flowers explains the heavy seed crops which can be harvested in certain years when very few flowers have been seen. Studies have been made on the method of reproduction in each type which have greatly aided in the development of better varieties through breeding.
TO DO THE BEST JOB WITH LESPEDEZA

Know Your Varieties and Their Place -
A. Common—no longer used extensively.
B. Korean—Piedmont and Mountains—good seed and hay yields
   (1) Rowan—same area as Korean—a little better than Korean
       in hay and seed production and especially superior on
       root-knot nematode infested soils.
   (2) Climax—same area as Korean—two weeks later maturity—
       some fewer seed but more hay than Korean.
C. Kobe—Coastal Plain and Southern Piedmont—later to start
   growth and 3 to 5 weeks later to mature than Korean.

Lime and Fertilize - Use Soil Test
A. 1 to 2 tons of lime per acre.
B. 1st year behind well fertilized small grain—75 lbs. muriate of
   potash in the Coastal Plain—nothing other parts of the state—
   2nd year 300 to 400 lbs. of 0-14-14 per acre especially where
   hay is removed.

Seed on Time -
A. Seed in small grain, pastures and pure stand

<table>
<thead>
<tr>
<th>Seeding</th>
<th>Variety</th>
<th>Date</th>
<th>Rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Plain</td>
<td>Kobe: Rowan on nematode infested soils</td>
<td>Feb. 1-March 15</td>
<td>20-40 lbs.</td>
</tr>
<tr>
<td>Mountains</td>
<td>Rowan, Korean</td>
<td>March 15-April 15</td>
<td>20-30 lbs.</td>
</tr>
</tbody>
</table>

* Kobe 30 to 40 lbs.—Korean, Rowan, Climax 20 to 30 lbs.

Use and Manage Properly -
A. For Hay—Cut when 8-12 inches high, leaves begin to shed or
   when blooms appear, whichever occurs first—cut in the mor-
   ning and put up in the afternoon.
B. For Seed—Combine seed early—as soon as pods turn brown
   Korean and Rowan—1st part of October.
   Kobe—1st part of November.
   3 weeks delay cuts seed yield in half.
C. For Grazing—Good summer supplementary grazing—also good
   fall grazing for beef cattle, dry cows and young animals—rotate
   grazing—avoid close grazing.
D. For Soil Improvement—Use in corn, small grain, lespedeza
   rotation as soil conserving and soil improving practice. Seed
   idle land to lespedeza.