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Jointvetch: Native Legume
in a New Role for Deer and Cattle

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ABSTRACT

American jointvetch (Aeschynomene americana L.), an annual legume native to central and southern Florida, is a palatable forage for deer and cattle. This plant is adapted to drier sites in the pinelands, but it will grow on extremely wet sites. Once established, it will withstand periodic flooding.

Jointvetch was established on a 10-acre site in wet prairie to determine its adaptability to such a site, its utilization by deer, and the dual use of jointvetch and native grasses by deer and cattle. Results indicate American jointvetch is well adapted to south Florida's wet prairies, which are characterized by summer flooding and winter drought. With annual disking and relatively light fertilization, a yield of 2 tons (ovendry) per acre was achieved the third year after planting.

Peak growth of jointvetch occurred in August and September. Plants bloomed in late September, and stems died by early December. Abundant seed was produced, which germinated in March when soil moisture was adequate.

During the first year, heavily browsed vetch developed a branching prostrate growth habit--in contrast to the usual single stem per plant. Late in the growing season numerous upright stems developed.

After the first year, about 1/2 ton per acre of other herbage was produced during the winter after jointvetch matured. This herbage was also palatable forage for cattle. Goobergrass (Amphicarpum muhlenbergianum), a native forage plant, increased significantly and produced 1 ton per acre on disked sites the third year. This plant could furnish food for cattle in the summer as well as during the winter.

Optimum deer-cattle utilization schedules must still be determined.

INTRODUCTION

American jointvetch (Aeschynomene americana L.), an annual legume native to central and southern Florida, is found palatable by deer and cattle. Natural distribution of the plant is primarily along roadsides and ditchbanks where grazing has been excluded. Adaptability of this vetch as a forage and cover crop is being appraised by the U.S.D.A. Soil Conservation Service in the Plants Materials Center at Arcadia, Florida.

Although adapted to drier sites in the pinelands, jointvetch will grow on extremely wet sites--even in water 12 inches to 18 inches deep if it can get established prior to inundation. With this attribute, jointvetch should grow well on wet prairies in south Florida. These prairies, transitional between pinelands and fresh water marshes, are dry during the winter and spring but subject to periodic flooding during the summer rainy season. Patches of jointvetch in the wet prairie would provide animal forage in areas currently of limited value for timber growing, cattle grazing, or wildlife use. Consequently, the opportunities for introducing jointvetch to the wet prairie were of interest to the Forest Service Integrated Cattle-Timber-Wildlife Research project.^{1/}

^{1/} A cooperative study by U.S.D.A., Forest Service and Soil Conservation Service and Babcock Florida Company.

A study was initiated in 1963 in Charlotte County, Florida, to appraise:

1. Adaptability of American jointvetch to a wet prairie under limited management.
2. Utilization by deer in an area where the deer population was relatively low.
3. Opportunities for dual use of jointvetch and native grasses by deer and cattle.

Observations in 4 years, 1963-1966, are reported.

ESTABLISHMENT

A 10-acre site (Pompano fine sand) was double disked; 4-12-12 fertilizer was applied at the rate of 300 pounds per acre; seeds were broadcast (10 pounds per acre); and the site was disked lightly by May 20, 1963. The area was fenced to exclude cattle but permit access by deer. Ten wire cages, of sufficient size to accommodate a circular plot containing 9.6 square feet, were installed. An 8-foot-wide strip around the study area was disked periodically to serve as a fire barrier and as a track-count plot for estimates of deer population.

Precipitation was above average in May, when almost 9 inches fell, but about average for the year. The study area was flooded by the heavy rainfall in May and several times thereafter during the summer.

Considerable seed germinated the last week in May. By mid-June, the number of jointvetch plants averaged 2 per square foot, but varied from none on the frequently flooded areas to 9 per square foot on drier areas. Because of considerable variation in the stand the first year, production was not estimated; but records were kept of growth habits of vetch and track counts of deer entering the study area overnight.

Young plants were utilized heavily by deer throughout the summer. In fact, almost all available vetch materials were removed. Track counts indicated overnight entries varied from 20 to 34 during the summer, with the peak occurring during late August.

Plants developed a prostrate habit of growth as a result of continuous removal of upright shoots by deer during July and early August. However, growth of Aeschynomene accelerated in late August. By early October, diameters of prostrate plants ranged to 9 feet, and many vertical stems had developed.

Uncaged plants had multiple branches, while caged plants exhibited the typical single-stemmed habit; thus, more grazeable tips of jointvetch were probably produced on the grazed areas than in the cages. Deer entries decreased throughout September and October. By December, only an occasional deer made use of the site.

Although a few seeds were produced as early as September 25, most plants began blooming in late September and early October. The primary seed-production period came in the late fall after the period of most intensive deer use. Most of the stand died by December, but a few heavily browsed plants lived into the spring of 1964. These plants continued to bear some seed; consequently, an excellent seed crop was produced, despite heavy browsing the previous year.

THE SECOND YEAR

Seed germination began about March 1, 1964, somewhat earlier than anticipated. Rainfall was 5.8 inches in February, however, and surface soil moisture was adequate. Precipitation throughout the remainder of 1964 was below average. The annual total was 41.9 inches, compared to an average of about 53 inches. The water table was at or near the soil surface frequently during the summer, but flooding was less frequent and of shorter duration in 1964 than in 1963.

The site was fertilized (300 pounds per acre, 4-12-12) and disked lightly on March 12. On April 13, jointvetch plants occurred on each of the ten 9.6 square foot caged plots; numbers ranged from 0.5 to 25.2 per square foot and averaged 8.3 per square foot.

The amount and season of deer use was similar in 1963 and 1964. For example, overnight visits averaged 25 in August 1963 and 22 in August 1964. On December 18, 1964, only two entries were noted. Jointvetch production averaged 1,251 pounds per acre, most of which was utilized by deer (Table 1).

A number of native plants other than Aeschynomene grew on the site the second year. Production of other herbage was 2,906 pounds per acre by November 1. Goobergrass (Amphicarpum muhlenbergianum), carpetgrass (Axonopus affinis), and yellowsedge bluestem (Andropogon virginicus), all of which cattle find palatable, composed 38 percent of total production (Table 2). To utilize this forage and to reduce competition with jointvetch the following spring, cattle from surrounding ranges were allowed access to the study area in mid-December. Cattle were removed on March 1 prior to start of vetch germination.

On March 8, cage plots contained the equivalent of 954 pounds per acre of ovendry forage. Cattle utilized all production outside the cages and trampled down most of the rough from the previous growing season.

Table 1.--Fall yields of jointvetch and other herbage,

1964-1966

Species	Year and Site Treatment						
	1964		1965			1966	
	Disked	Disked	Undisked	Average	Disked	Undisked	Average
	Pounds per Acre (Ovendry)						
Jointvetch	1,251	4,248	2,759	3,504	1,316	1,062	1,189
Other	2,906	1,863	2,324	2,094	2,576	3,160	2,868
TOTAL	4,157	6,111	5,083	5,598	3,892.	4,222	4,057

Table 2.--Fall composition of herbage other than
jointvetch, 1964 to 1966

Species	Year and Site Treatment				
	1964	1965	1966		
	: Disked	: Disked	: Undisked	: Disked	: Undisked
- - - - - Percent of total dry weight - - - - -					
<u>Amphicarpum muhlen-</u> <u>bergianum</u> (Schult.) Hitchc.	17	97	40	32	27
<u>Paspalum distichum</u> L.	24	0	16	0	0
<u>Axonopus affinis</u> Chase	14	0	6	13	7
<u>Paspalum notatum</u> Flugge	0	0	10	1	18
<u>Pluchea foetida</u> (L.) D.C.	11	0	0	2	0
<u>Andropogon vir-</u> <u>ginicus</u> L.	7	1	6	3	3
<u>Panicum tenerum</u> Beyr.	5	0	0	0	0
<u>Eragrostis chariis</u> (Schult.) Hitchc.	2	1	17	0	1
<u>Centella erecta</u> (L.f.) Fern.	2	1	0	9	4
<u>Paspalum</u> sp.	0	0	0	10	0
<u>Axonopus furcatus</u> (Flugge) Hitchc.	0	0	2	0	9
Other	18	0	3	30 *	31 *
TOTAL	100	100	100	100	100

* Most of these were forbs of lesser importance to deer or cattle.

THE THIRD YEAR

During March 1965, one-half of the site was disked, and the entire area was fertilized at the rate of 300 pounds per acre of a 4-12-12 fertilizer. No vetch seed had germinated on March 1, but by March 24, 1.3 plants per square foot had emerged. Almost 5 inches of rain fell in March (average is 2 inches); otherwise, the total and distribution of rainfall in 1965 was about average.

The average yield of jointvetch in the fall of 1965 was 3,504 pounds (ovendry) per acre, almost three times greater than the 1964 yield (Table 1).

The stand was 49 inches tall, compared to 43 inches in 1964; and the number of stems per square foot increased from 6 to 16. Disking significantly (95 percent probability level) affected yields of jointvetch. Yield on the disked plots was 4,248 pounds per acre, compared to 2,759 pounds per acre on undisked plots.

Deer utilized 48 percent of the total jointvetch production in 1965. Deer use was very high in September and October when the number of overnight entries varied from 96 to 125. Use dropped sharply in November as the vetch matured, and by December only five entries were recorded.

Aeschynomene bloomed profusely in late September, and plants were dead by December 2. Much seed was produced.

Yield of herbage other than jointvetch was 2,094 pounds per acre, 28 percent less than yield in 1964 (Table 1). Yield of other herbage was not significantly affected by disking in 1965; however, composition was affected. Goobergrass (Amphicarpum muhlenbergianum) composed 97 percent of the other herbage on disked plots and only 40 percent on undisked plots (Table 2). This grass also was more abundant on both site treatments in 1965 than it was the previous year. Goobergrass is a desirable native forage plant that is readily taken by cattle. It is not used by deer.

Cattle were permitted to graze the study area again from mid-December to mid-March. Caged plots contained 1,166 pounds (oven-dry) per acre of herbage when clipped in mid-March. Cattle had used all of this herbage with the exception of an unpalatable Senecio which composed 22 percent of the weight. Goobergrass was the most abundant species in the winter; it made up 30 percent of the total herbage weight. Previous disking did not significantly affect total winter herbage production or goobergrass production.

THE FOURTH YEAR

Half of the 10-acre study area was again disked in March and 300 pounds of 4-12-12 was applied per acre over the entire site. Rainfall was below average during the spring, but was about normal the remainder of the year.

Jointvetch production dropped to an average of 1,189 pounds per acre (Table 1). The stand was 42 inches tall and averaged only 9 stems per square foot. Vetch production was only slightly greater on the disked area.

Deer use also dropped. Highest use occurred in late summer as usual. The greatest number of overnight entries (21) occurred in September. Vetch use totaled 38 percent, but production was down to about one-third of the previous year's yield. Fall yield of herbage other than jointvetch was 2,868 pounds per acre; a yield almost equaling the 1964 production.

Composition did not appear to be greatly affected by site treatment. Disked plots still had a higher composition of goobergrass, but it had dropped sharply to only 32 percent of the total production (Table 2). Many new species began to appear and the composition was more variable.

SUMMARY OF OBSERVATIONS

1. American jointvetch, a reseeding annual summer legume, is well adapted to Florida's wet prairies, which are subject to summer flooding and winter drought. With annual disking and relatively light fertilization, a yield of 2 tons (ovendry) per acre was achieved the third year after planting on a Pompano fine sand; however, the yield dropped to less than 1 ton per acre the fourth year.
2. Peak growth of jointvetch occurred in August and September. Plants bloomed in late September, and stems usually died by early December. Germination of seed occurred in March when soil moisture was adequate.
3. Disking in March significantly increased subsequent yield of jointvetch.
4. Young plants and tender tips and leaves of older vetch were found very palatable by deer. Deer use was greatest in the summer and declined as the vetch matured in the fall.
5. When heavily browsed the year of establishment, vetch developed a prostrate growth habit. Late in the growing season, numerous upright stems developed--in contrast to the usual growth of a single stem per plant. Many of the heavily browsed plants lived through the winter.

6. After the first year, about 1/2 ton (ovendry) per acre of other herbage was produced during the winter period after jointvetch matured (December to March). This herbage probably utilized nitrogen fixed by the vetch, and cattle found it very palatable. Use of this forage by cattle probably paid the cost of re-establishing the vetch.
7. Goobergrass, a native forage grass, increased significantly over a 3-year period. Disking accelerated the increase; and 1 ton per acre of goobergrass was produced during the summer of the third year.
8. The fourth year's production of jointvetch and goobergrass dropped sharply. Production of other herbage increased and several new species appeared, many of which were of lesser importance to deer or cattle.
9. Further study is needed to determine whether this grass can be maintained in combination with jointvetch for possible dual use by deer and cattle in the summer-fall period. Supplemental grazing of jointvetch by cattle in areas where deer use is light might delay the maturity of vetch into the late fall and early winter. This would provide additional winter forage for deer. Such optimum utilization schedules for jointvetch must still be determined.