Replacement of a Population of Johnson Grass by a Vine-Forb Community

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Lake Texoma, an artificial lake on the Washita and Red Rivers, was impounded in 1945. Since that time, plant succession has been very rapid near the shoreline, particularly in abandoned cropland which has been protected from grazing. One such area is a revegetating field of Johnson grass at Willis, Oklahoma. This field is located in section 12, T8S, and R4E, just south of the Willis school and east of Oklahoma highway number 99. It 1958 it was dominated completely by Johnson grass, but by 1959 a considerable area in the northeast corner had been occupied by an herbaceous, leguminous vine. Observations in 1962 and in 1964 indicated a considerable increase in the area of replacement by this climbing bean. Accordingly, it was decided to determine the composition of both the Johnson grass and invading climbing bean communities in the summer of 1964.

The communities were sampled by the short line method which was devised for this purpose. In practice a willow stick, 0.25-inch wide and 12 inches long, was laid on the vine-forb mass of plants at intervals of 10 paces until a sample of 100 short lines was obtained (Table I). Species presence was recorded whenever any aerial part of a plant—stem, leaf, flower, or fruit—was observed either below or above the line. This datum has been designated as foliage frequency since the plant is not necessarily rooted below the line. When the data obtained by this short line method were compared to those derived from 50 quadrates of 0.1-square-meter each, the number of species per sampling unit was similar (3.2 vs. 3.7) and the relative frequency values were remarkably alike.

Using the short line method in 1964, the Johnson grass community was found to be dominated by Johnson grass, *(Sorghum halepense)*[1] with a relative foliage frequency of 40.7. The horseweed *(Conyza canadensis)* and the climbing bean *(Strophostyles helvola)* were important secondary species. Most of the stand of Johnson grass (33 acres as of 1964) appears the same as when first noted in 1958. In the northeast corner of the field, however, somewhat over 7 acres of the Johnson grass community has been destroyed by the climbing bean. The climbing bean destroys the Johnson grass by climbing up the flowering culms of the Johnson grass, weighing them down, and shading them out. This phenomenon has changed the Johnson grass community into one dominated largely by the climbing bean. Although the climbing bean was the important dominant with a relative foliage frequency of 22.7, the following forbs were widely distributed: *Pluchea purpurascens,* 10.5; *Conyza canadensis,* 7.6; and *Solanum torreyi,* 7.3. The longevity of this vine-dominated community is uncertain. As of 1964, there were occasional specimens of *Acer negundo* and *Salix nigra* scattered throughout the community. If protection against grazing is continued, the entire plot of 40 acres should become a bottomland forest. It is probable, however, that this unusual vineland will persist for some time and remain available for study by future botanists for at least a decade.

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[1]All plant names according to the Keys to the Flora of Oklahoma, 1960 by U. T. Waterfall.

Table I. Replacement of a population of Johnson grass by a climbing bean community. Based on 100 short lines of one foot each.

	Relative foliage frequency	
	Johnson grass	Vine-forb
Sorghum halepense	40.7	3.0
Conyza canadensis	9.1	7.6
Strophostyles helvola	8.5	22.7
Pluchea purpurascens	4.4	10.5
Solanum torreyi	1.5	7.3
Other species	35.8	48.9
Total species	33	32
Species per line	1.8	3.7