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Distribution of *Spartina pectinata* Link in Iowa

By DAVID G. MOBBERLEY

Earlier taxonomic studies in the genus *Spartina* of the Gramineae show the existence of but one of the sixteen species in Iowa, *Spartina pectinata* Link. That it is widely distributed throughout the state is evident from Figure 1. The counties identified by dots have yielded specimens presently accessioned into the herbaria of Iowa State College, State University of Iowa and Simpson College. In addition, the species has been observed in numerous other counties although records are not authenticated by specimens entered into institutional herbaria.

To most taxonomists, the species has seemed easily identifiable throughout its range, even in areas where it exists in common with one or more of its congeners. However, the most recent monographic study of the genus (Mobberley, 1956) suggests that despite its distinctiveness, a number of traits such as panicle length, spike number, spike length and spikelet number exhibit considerable variability. Among these same traits, variability was also evident to earlier workers (Farwell, 1920; Saint-Yves, 1932; and Fernald, 1933) who erected a number of nomenclatorial varieties, sub-varieties and forms on the premise that specimens exhibiting such variability were

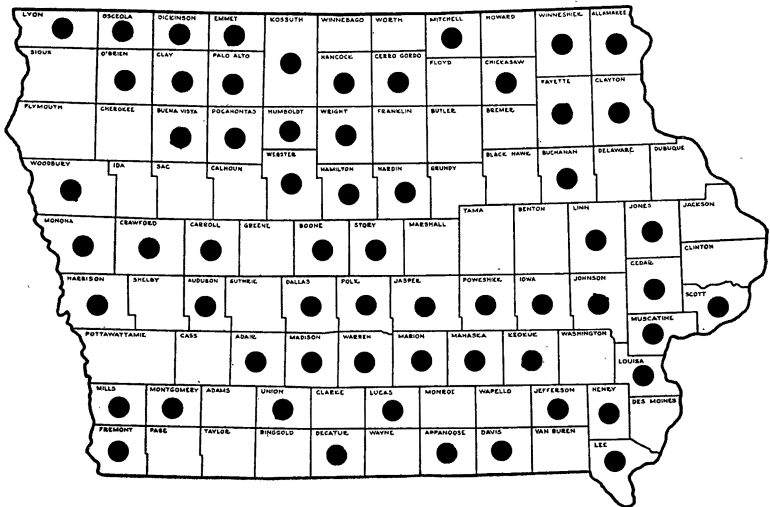


Figure 1. Distribution by counties of *Spartina pectinata* in Iowa.

actually discrete taxa. The author's previous study of the genus (Mobberley, 1956) showed, by means of mass collection studies, the names to have been ascribed to selected specimens that exhibited extremes of somewhat variable parts of the panicle. When numerous panicles were at hand, these extremes were seen as parts of a population that graded without discontinuity from one extreme to the other in typical unimodal fashion. Owing to the discovery of the absence of any discontinuity in the four variable traits above, the names ascribed to these extreme specimens have been rejected.

Critical study of this variability evident in panicle length, spike number, spike length and spikelet number leads inevitably to speculation concerning the role of polyploidy. Several levels of polyploidy have been found within the species and as reported in the earlier study (Mobberley, 1956) a western Iowa specimen (Monona County) possessed 70 chromosomes while a central Iowa specimen (Boone County) was found with 42 chromosomes. More recent efforts to discover chromosome numbers for eastern Iowa specimens have failed.

With only this most meager suggestion of chromosome number differences at hand, an attempt was made to discern whether any significant differences in the variable traits described above could be found by comparing specimens of *S. pectinata* from various parts of the state. When specimens were compared in connection with single traits, i.e. spike number alone, no geographic or distributive correlations were found. Specimens with few spikes were encountered just as much in one part of the state as another. Similar results obtained with panicle length, spike length and spikelet number. At least two alternative interpretations may be warranted. Either varying levels of polyploidy do not effect variability in these traits or plants of varying levels of polyploidy exist throughout the state.

Continuing analysis of certain traits of the panicle of *S. pectinata* revealed marked variability in the way in which spikes are disposed upon the rachis of the panicle. In some specimens they appear to be bunched while in others they are diffuse. The same variability is evident in the manner in which spikelets are arranged upon the rachis of the spike. Fortunately, this degree of bunching or imbrication is amenable to numerical analysis by means of arithmetic ratios representing panicle length divided by spike number and spike length divided by spikelet number. Figure 2 shows data from all available specimens plotted in a scatter diagram with panicle length-spike number ratio on the vertical axis and spike length-spikelet number ratio on the horizontal axis.

It is evident from the diagram that without reference to geographic location, the dots representing specimens do not show any

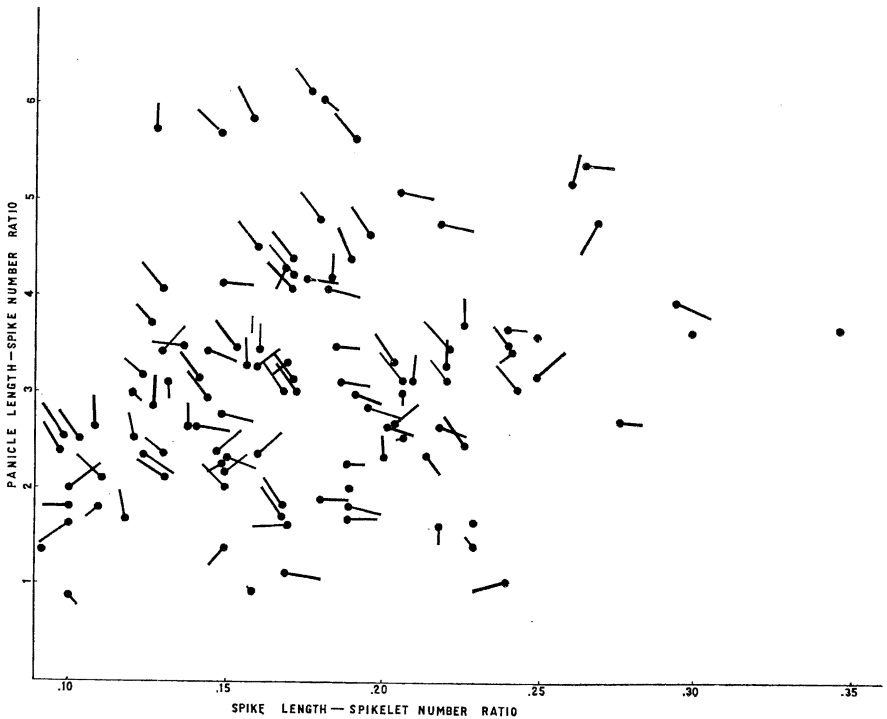


Figure 2. For description, see text.

discontinuity. When, however, geographic location of each specimen is introduced into the diagram, certain trends become evident. The collection site of each specimen is indicated by means of a heavy black line radiating from the dot. The angle of line represents direction from Story County while the length of the line indicates approximate distance from the same point. Examination of the central mass of dots disposed midway between the correlates reveals that specimens from virtually every part of the state are almost identical with respect to these ratios. The curious thing, however, may be seen in the extremes on the diagram for it is of some note that those specimens represented by dots in the upper left quarter of the diagram were almost all taken from locations in the northwestern part of the state while a preponderance of those "extreme" specimens in the right-hand side of the diagram were collected from sites in the central and eastern parts of the state.

The evidence points to the fact that many specimens with a high degree of bunching (imbrication) of spikelets along the spike rachis and moderate to diffuse arrangement of spikes on the panicle rachis are to be found in western and northwestern Iowa. On the other hand, some specimens with a more diffuse arrangement of spikelets

and moderate arrangement of spikes on the panicle rachis are seemingly more typical of the eastern part of the state. Hence, with attention focused upon the extremes of what is a continuous population these trends become evident.

No attempt is made to explain or evaluate the apparent population trend. Much additional data will be required before conclusions are warranted. Analysis of variability of microscopic features of the inflorescence and the leaf as well as other macroscopic traits if carried out might provide such data.

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