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A PRELIMINARY LIST OF PLANTS OF THE SAND MOUNDS OF MUSCATINE AND LOUISA COUNTIES, IOWA

MABEL ESTLE BROWN AND ROBERT G. BROWN ¹

This paper deals with the flora of a dune area in Muscatine and Louisa counties in Iowa known locally as the Sand Mound, the only region of its kind nearer than the sand hills of Nebraska to the west and the dunes of Lake Michigan to the east. Shimek ² in 1893 listed the plants of the Iowa Sand Lands including the Sand Mound, but no one has actually determined the flora of the large dune. It is the purpose of this paper to learn as far as possible what plants grow on the mound including its margins.

THE SAND MOUND

The Sand Mound is located ten miles south of the city of Muscatine on the west side of the Mississippi river. It rises thirty or forty feet in height above the surrounding river flood plain. It comprises approximately fifteen hundred acres, a little over half being in Muscatine County and the rest in Louisa. It is roughly horseshoe-shaped. The south prong of the shoe ends in the Mississippi river while the north prong is bordered by a marsh which circles the mound a mile and a half westward and is continuous southward to McKee Lake.

In regard to the geologic origin of the Sand Mound, J. A. Udden in the "Geology of Muscatine County" says, "On the south half of sections 33 and 34 there is a remnant of a terrace known as the Sand Mound, rising from thirty to forty feet above the level of the island. It consists of rather fine white sand with very few pebbles. Some of the surface material on the island may have been derived from this terrace. . . ." Professor F. M. Witter, in his "History of Muscatine County," writes: "The Sand Mound, the northern part of which is in the southeastern corner of the county, is no doubt a part of the debris of the sandstones crushed by the glaciers, washed away by the river, or both. . . ." No mat-

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² Shimek, Bohumil, "The Sand Flora of Iowa" *Bulletins from the Laboratories of Natural History*, Vol. VII.

ter what the origin of this mound of sand in this river bottom the fact remains that the area exists and is subject to wind action today.

In general, the direction of the "blows," which are on the east portion of the mound, is from northwest to southeast. Some blows are twenty or thirty feet deep and some as long as an eighth mile or more. Where the sand is advancing on the remnant forest, entire trees of an estimated forty-foot height are buried to their top branches. Others have varying portions of their trunks yet exposed.

Between the more or less permanent west side and the moving area is a strip of land one-half to one-and-one-fourth miles wide used for watermelons, cantaloupes, and sweet potatoes.

SOME OF THE SHOWY PLANTS AND THE TIME THEY BLOSSOM ON THE MOUND

Although the authors began watching the dune area March 30, the first plant found was on April 19 at the foot of East Hill along the marsh, *Cardamine pennsylvanica*. The first real dune plant came about the same time, brought perhaps by our first warm week in an abnormally cold spring. This plant was *Draba caroliniana* and was followed by bluets, (*Houstonia patens*). In a week a showy yellow succulent plant *Corydalis crystallina* came and stayed a month or more. May and June were the months of rapid plant growth. The east slope was dominated by columbine, (*Aquilegia canadensis*). The sandy prairie violet, (*Viola pedatifida*) grows in the open to the edge of the moving sand.

After the early spring flowers there was a definite trend in the flower color toward yellow (orange) and blue. Following the deep orange-yellow of *Lithospermum angustifolium* and the creamy ivory *Baptisia bracteata* came the blue of *Linaria canadensis*. The latter dominated for two weeks or more every part of the sand mound except the open blow.

Astragalus distortus was found on what we thought to be virgin sod in the middle of the mound. Later a few plants were found in virgin sod along an east side gully. This is rare in Muscatine county. A second rare plant in Iowa was found at the foot of the Sand Mound at the east end of the footpath across the marsh. This was mousetail, *Myosurus minimus*.

There followed in rapid succession *Penstemon pallidus*, *Delphinium Penardi*, *Amorpha canescens*, *Achillea Millifolium*, *Specularia perfoliata*, *Erigeron canadensis*, *Helianthus petiolaris*, and

then the showy lavender-colored *Pentstemon grandiflorus*. Along with these were of course many others but these were most prevalent among the herbaceous plants.

Trees and shrubs are present along the east side of the area and occasionally on the west slope. There are some newly-planted Scotch pine, *Pinus sylvestris*, in the blows, intended to bind the sand. *Rhus canadensis* var. *trilobata* is thick in patches throughout the area, particularly along fence rows. Red cedar, *Juniperus virginiana*, Scotch pine, *Pinus sylvestris*, and white pine, *Pinus Strobus*, make up the various surrounding homestead groves. The east side woods is dominated by soft maple, *Acer saccharinum*, Kentucky coffee bean, *Gymnocladus dioica*, and honey locust, *Gleditsia triacanthos*, while the shrubs beneath are principally prickly ash, *Zanthoxylum americanum*, hop tree, *Ptelea trifoliata*, bladdernut, *Staphylea trifolia* and buttonbush, *Cephalanthus occidentalis*.



Fig. 1. *Opuntia Rafinesquii*



Fig. 2. Trees are buried beneath shifting sands. *Spartina cynosuroides* on the banks on each side of the blow above are being gradually undermined by wind action. In the foreground is *Lespedeza capitata*.



Fig. 3. Looking north from a high point south of McKee Lake. The arrow in the background indicates a car.



Fig. 4. *Aquilegia canadensis* covers the east slope of the Sand Mound.

The sequence of families and genera follows that of Gray's Manual, ed. 7, as does the nomenclature. The plants marked with an asterisk were not included in Prof. Shimek's list.

DIVISION I. PTERIDOPHYTA

- | | |
|-------------------------------|---|
| Equisetaceae | * <i>Equisetum hyemale</i> L. var. <i>robustum</i> (A. Br.) A. A. Eaton |
| * <i>Equisetum arvense</i> L. | |

DIVISION II. SPERMATOPHYTA

Class I MONOCOTYLEDONEAE

- | | |
|--|---|
| Typhaceae | <i>Sporobolus cryptandrus</i> (Torr.) Gray |
| * <i>Typha latifolia</i> L. | <i>Sporobolus neglectus</i> Nash. |
| Hydrocharitaceae | <i>Agrostis alba</i> L. |
| * <i>Elodea canadensis</i> Michx. | <i>Sphenopholis obtusata</i> (Michx.) Scribn. |
| Gramineae | <i>Koeleria cristata</i> (L.) Pers. |
| <i>Andropogon furcatus</i> Muhl. | * <i>Spartina cynosuroides</i> (L.) Roth. |
| <i>Andropogon scoparius</i> Michx. | <i>Bouteloua curtipendula</i> (Michx.) Torr. |
| <i>Sorghastrum nutans</i> (L.) Nash. | <i>Bouteloua hirsuta</i> Lag. |
| <i>Digitaria sanguinalis</i> (L.) Scop. | <i>Triplasis purpurea</i> (Walt.) Chapm. |
| <i>Paspalum ciliatifolium</i> Michx. | <i>Eragrostis pectinacea</i> (Michx.) Steud. |
| * <i>Panicum lanuginosum</i> Ell. | <i>Poa compressa</i> L. |
| * <i>Panicum praecoccum</i> Hitch. & Chase | <i>Poa pratensis</i> L. |
| <i>Panicum Scribnerianum</i> Nash. | <i>Festuca octoflora</i> Walt. |
| <i>Panicum virgatum</i> L. | * <i>Lolium multiflorum</i> Lam. |
| * <i>Setaria glauca</i> (L.) Beauv. | <i>Agropyron Smithii</i> Rydb. |
| <i>Setaria viridis</i> (L.) Beauv. | <i>Hordeum jubatum</i> L. |
| <i>Cenchrus tribuloides</i> Walt. | |
| <i>Stipa spartea</i> Trin. | |
| * <i>Aristida</i> sp. | |
| * <i>Alopecurus carolinianus</i> Walt. | |



Fig. 5. *Penstemon grandiflorus*.



Fig. 6. *Panicum virgatum*

- | | |
|---------------------------------------|--|
| * <i>Hordeum nodosum</i> L. | <i>Commelina virginica</i> L. |
| <i>Elymus canadensis</i> L. | Juncaceae |
| Cyperaceae | <i>Juncus tenuis</i> Willd. |
| <i>Cyperus filiculmis</i> Vahl. | Liliaceae |
| <i>Cyperus Schweinitzii</i> Torr. | * <i>Smilax herbacea</i> L. |
| * <i>Scirpus pedicellatus</i> Fernald | * <i>Allium canadense</i> L. |
| <i>Carex cephalophora</i> Muhl. | * <i>Smilacina stellata</i> (L.) Desf. |
| <i>Carex festucacea</i> Schkuhr. | Amaryllidaceae |
| <i>Carex pennsylvanica</i> Lam. | * <i>Hypoxis hirsuta</i> (L.) Coville |
| Araceae | Iridaceae |
| <i>Acorus Calamus</i> L. | * <i>Iris versicolor</i> L. |
| Commelinaceae | <i>Sisyrinchium campestre</i> Bicknell |
| <i>Tradescantia reflexa</i> Raf. | |

Class II DICOTYLEDONEAE

- | | |
|--|---|
| Salicaceae | <i>Oxybaphus nyctagincus</i> (Michx.) |
| <i>Salix humilis</i> Marsh. | Sweet. |
| <i>Salix longifolia</i> Muhl. | Aizoaceae |
| Betulaceae | <i>Mollugo verticellata</i> L. |
| * <i>Betula lutea</i> Michx. | Caryophyllaceae |
| Urticaceae | * <i>Arcnaria lateriflora</i> L. |
| * <i>Cannabis sativa</i> L. | * <i>Cerastium nutans</i> Raf. |
| * <i>Celtis occidentalis</i> L. | <i>Cerastium viscosum</i> L. |
| Santalaceae | * <i>Cerastium vulgatum</i> var. <i>hisutum</i> |
| <i>Comandra umbellata</i> (L.) Nutt. | Fries. |
| Polygonaceae | <i>Silene antirrhina</i> L. |
| * <i>Fagopyrum esculentum</i> Moench. | <i>Silene stellata</i> (L.) Ait. f. |
| <i>Rumex Acetocella</i> L. | Ranunculaceae |
| <i>Rumex crispus</i> L. | <i>Caltha palustris</i> L. |
| * <i>Rumex altissimus</i> Wood. | * <i>Ranunculus abortivus</i> L. |
| <i>Polygonum Convolverulus</i> L. | <i>Ranunculus fascicularis</i> Muhl. |
| * <i>Polygonum pennsylvanicum</i> L. | * <i>Myosurus minimus</i> L. |
| <i>Polygonum ramosissimum</i> Michx. | * <i>Thalictrum dioicum</i> L. |
| * <i>Polygonum sagittatum</i> L. | <i>Anemone canadensis</i> L. |
| <i>Polygonum tenue</i> Michx. | <i>Anemone caroliniana</i> Walt. |
| Chenopodiaceae | <i>Anemone cylindrica</i> Gray. |
| <i>Cycloloma atriplicifolium</i> (Spreng.) | <i>Clematis Pitcheri</i> T. & G. |
| Coult. | * <i>Aquilegia canadensis</i> L. |
| <i>Chenopodium album</i> L. | <i>Delphinium Penardi</i> Huth. |
| <i>Chenopodium Botrys</i> L. | Menispermaceae |
| <i>Chenopodium leptophyllum</i> Nutt. | * <i>Menispermum canadense</i> L. |
| <i>Salsola Kali</i> var. <i>tenuifolia</i> G. F. | Fumariaceae |
| W. Mey. | * <i>Corydalis aurea</i> Willd. |
| Amaranthaceae | * <i>Corydalis crystallina</i> Engelm. |
| * <i>Amaranthus retroflexus</i> L. | Cruciferae |
| <i>Froelichia floridana</i> (Nutt.) Moq. | <i>Draba caroliniana</i> Walt. |
| Phytolaccaceae | <i>Lepidium apetalum</i> Willd. |
| * <i>Phytolacca decandra</i> L. | * <i>Lepidium virginicum</i> L. |
| Nyctaginaceae | * <i>Capsella bursa-pastoris</i> (L.) Medic. |



Fig. 7. The trees in the background border the Mississippi river.



Fig. 8. *Cenchrus tribuloides* grows everywhere on the Sand Mound but particularly on the sides of "fresh blows."

- Sisymbrium canescens* var. *brachycarpon* (Richards) Wats.
Linum sulcatum Riddel.
 Oxalidaceae
 **Dentaria laciniata* Muhl. **Oxalis corniculata* L.
 **Cardamine bulbosa* (Schreb.) BSP *Oxalis stricta* L.
 **Cardamine pennsylvanica* Muhl. *Oxalis violacea* L.
 **Arabis hirsuta* (L.) Scop. Geraniaceae
 **Arabis dentata* T. & G. *Geranium carolinianum* L.
 Capparidaceae *Zygophyllaceae*
Polanisia graveolens Raf. *Tribulus terrestris* L.
 **Polanisia trachysperma* T. & G. Rutaceae
Saxifragaceae *Zanthoxylum americanum* Mill.
Heuchera hispida Pursh. *Ptelea trifoliata* L.
Ribes gracile Michx. Polygalaceae
 Rosaceae *Polygala incarnata* L.
Spiraea salicifolia L. *Polygala sanguinea* L.
Fragaria virginiana Duchesne. **Polygala Senega* L.
Potentilla arguta Pursh. *Polygala verticillata* L.
Potentilla monspeliensis L. Euphorbiaceae
Rubus sp. *Croton capitatus* Michx.
Rosa humilis Marsh. **Croton glandulosus* var. *septentrionalis* (Muell.) Arg.
Rosa pratincola Greene. *Euphorbia corollata* L.
Prunus americana Marsh. **Euphorbia dentata* Michx.
 **Prunus virginiana* L. *Euphorbia maculata* L.
 Leguminosae *Euphorbia polygonifolia* L.
 **Gymnocladus dioica* (L.) Koch Anacardiaceae
Cassia chamaecrista L. *Rhus canadensis* var. *trilobata*
 **Cassia Medsgeri* Shafer. (Nutt.) Gray.
Baptisia bracteata (Muhl.) Ell. *Rhus glabra* L.
Crotalaria sagittalis L. *Rhus Toxicodendron* L.
 **Trifolium repens* L. Celastraceae
Trifolium stoloniferum Muhl. **Evonymus atropurpureus* Jacq.
Melilotus alba Desr. Staphyleaceae
 **Melilotus officinalis* (L.) Lam. **Staphylea trifolia* L.
Amorpha canescens Pursh. Aceraceae
Amorpha fruticosa L. **Acer Negundo* (Moench) Koehne.
Petalostemum candidum Michx. **Acer saccharinum* L.
Petalostemum purpureum (Vent.) Rydb. Balsaminaceae
Tephrosia virginiana (L.) Pers. *Impatiens biflora* Walt.
Astragalus distortus T. & G. Rhamnaceae
 **Astragalus canadensis* L. *Ceanothus americanus* L.
Desmodium canadense (L.) DC Vitaceae
Desmodium illinoense Gray **Psedera quinquefolia* (L.) Greene.
Lespedeza capitata Michx. *Vitis vulpina* L.
Strophostyles helvola (L.) Britton. Tiliaceae
 **Robinia Pseudo-Acacia* L. *Tilia americana* L.
Strophostyles pauciflora (Benth.) Malvaceae
 Wats. *Callirhoe triangulata* (Leavenw.)
 Linaceae Gray.



Fig. 9. *Physostegia virginiana*.



Fig. 10. *Spartina cynosuroides* found in blows on top of the Sand Mound in Muscatine County, Iowa.

- **Abutilon Theophrasti* Medic. *Phlox pilosa* L.
 **Malva rotundifolia* L. Hydrophyllaceae
 **Hibiscus militaris* Cav. *Ellisia Nyctelea* L.
 Hypericaceae Boraginaceae
Hypericum cistifolium Lam. *Lithospermum angustifolium*
 Cistaceae Michx.
Helianthemum canadense (L.?) *Lithospermum canescens* Lehm.
 Michx. *Lithospermum Gmelini* Hitchc.
Helianthemum majus BSP. *Onosmodium occidentale* Mackenzie.
Lechea stricta Leggett. **Myosotis virginica* (L.) BSP.
Lechea tenuifolia Michx. Verbenaceae
 Violaceae *Verbena angustifolia* Michx.
Viola fimbriatula Sm. *Verbena bracteosa* Michx.
Viola pedata L. *Verbena hastata* L.
 **Viola pedatifida* G. Don. *Verbena stricta* Vent.
 **Viola palmata* L. **Lippia lanceolata* Michx.
 **Viola sagittata* Ait. Labiatae
 **Viola sororia* Willd. *Teucrium canadense* L.
 Cactaceae *Stachys palustris* L.
Opuntia Rafinesquii Engelm. **Monarda fistulosa* L.
 Onagraceae *Monarda mollis* L.
Oenothera biennis L. *Monarda punctata* L.
Oenothera muricata L. *Hedeoma hispida* Pursh.
Oenothera rhombipetala Nutt. *Pycnanthemum flexuosum* (Walt.)
 Umbelliferae BSP.
Eryngium yuccifolium Michx. **Nepeta cataria* L.
 **Chaerophyllum procumbens* (L.) **Physostegia virginiana* Benth.
 Crantz. **Leonurus Cardiaca* L.
 Cornaceae Solanaceae
 **Cornus asperifolia* Michx. **Solanum nigrum* L.
 **Cornus stolonifera* Michx. *Physalis pruinosa* L.
 Primulaceae *Physalis pubescens* L.
Androsace occidentalis Pursh. **Physalis virginiana* Mill.
 **Steironema ciliatum* (L.) Raf. **Datura Stramonium* L.
 Oleaceae Scrophulariaceae
 **Fraxinus americana* L. *Verbascum Blattaria* L.
 Apocynaceae *Verbascum Thapsus* L.
Apocynum cannabinum L. *Scrophularia leporella* Bicknell.
 Asclepiadaceae **Scrophularia lanceolata* Pursh.
 **Asclepias amplexicaulis* Sm. *Pentstemon gracilis* Nutt.
Asclepias syriaca L. *Pentstemon grandiflorus* Nutt.
Asclepias tuberosa L. *Linaria canadensis* (L.) Dumont.
Asclepias verticillata L. *Synthyris Bullii* Heller.
Acerates viridiflora Ell. **Veronica peregrina* L.
 Convolvulaceae **Veronica Tournefortii* C. C. Gmel.
Convolvulus sepium L. **Chelone* sp.
Cuscuta arvensis Beyrich. Bignoniaceae
 Polemoniaceae *Catalpa speciosa* Warder.
 **Phlox maculata* L. Acanthaceae

- Ruellia carolinensis* (Walt.)
 Steud.
Gnaphalium polycephalum Michx.
 Plantaginaceae
Plantago aristata Michx.
 **Plantago Purshii* R. & S.
Plantago Rugelii Dcne.
 **Plantago virginica* L.
 Rubiaceae
 **Houstonia patens* Ell.
 **Galium aparine* L.
 **Cephalanthus occidentalis* L.
 Caprifoliaceae
 **Sambucus canadensis* L.
 Curcubitaceae
 **Sicyos angulatus* L.
 Campanulaceae
 **Campanula americana* L.
Specularia perfoliata A. DC.
 Lobeliaceae
Lobelia inflata L.
Lobelia spicata Lam.
 Compositae
 **Vernonia altissima* Nutt.
Kuhnia eupatorioides L.
Liatris cylindracea Michx.
Liatris pycnostachya Michx.
Liatris scariosa Willd.
Solidago graminifolia Salisb.
Solidago missouriensis Nutt.
Solidago nemoralis Ait.
Solidago rigida L.
Solidago serotina Ait.
Solidago speciosa var. *angustata*
 T. & G.
Aster linariifolius L.
Aster multiflorus Ait.
Aster novae-angliae L.
Aster oblongifolius var. *rigidulus*
 Gray.
Aster ptarmicoides T. & G.
Aster sericcus Vent.
Erigeron canadensis L.
Erigeron divaricatus Michx.
Erigeron ramosus BSP.
Erigeron philadelphicus L.
Antennaria plantaginifolia Richards.
Antennaria neglecta Greene.
Antennaria neodioica Greene.
Silphium integrifolium Michx.
Silphium laciniatum L.
Ambrosia artemisiifolia L.
Ambrosia psilostachya DC.
Xanthium commune Britton.
Rudbeckia hirta L.
Rudbeckia subtomentosa Pursh.
Brauneria pallida Britton.
Brauneria angustifolia (DC.)
 Heller.
Lepachys pinnata T. & G.
 **Helianthus petiolaris* Nutt.
Helianthus scaberrimus Ell.
Helianthus occidentalis Riddell.
Helianthus grosseserratus Martens.
Coreopsis palmata Nutt.
 **Helenium autumnale* L.
Dyssodia papposa Hitchc.
Achillea Millefolium L.
Artemisia caudata Michx.
Artemisia dracunculoides Pursh.
Artemisia ludoviciana Nutt.
Cacalia tuberosa Nutt.
Senecio Balsamitae var. *pauperculus*
 (Michx.) Fernald
Senecio plattensis Nutt.
Cirsium altissimum Spreng.
Cirsium Hillii Fernald.
Krigia amplexicaulis Nutt.
Taraxacum officinale Weber.
Lactuca canadensis L.
Lactuca ludoviciana Riddell.
Lactuca scariola L.

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