Proceedings of the Iowa Academy of Science

Volume 29 | Annual Issue Article 61

1922

Description and Key of the Genus Cucurbita

Fred C. Werkenthin
Iowa State College

DESCRIPTION AND KEY OF THE GENUS CUCURBITA

FRED C. WERKENTHIN

ORIGIN OF CUCURBITA SPECIES

J. H. Trumbull, in a letter quoted in Bull. Torrey Bot. Club, Vol. *6*:69-70; 1876, states, "I could never discover *where the doubt came in,* as to the American origin of several well-known varieties of these gourds, or Millions as some call them, or Pompions as I may call them. In England, the name 'squash' was understood to be of American origin. Robert Boyle mentions his experiment with the seed of 'squash' which is an Indian kind of pompion that grows apace." "Beverley (History of Virginia, 124) describes the Macocks as 'a sort of Melopepones, or lesser sort of Pompion or Cashaw' *squash,* or *Squouter-squash,* which is their name among the northern (i.e. New England) Indians." According to Alphonse de Candolle in "Origin of Cultivated Plants, 1892," the pumpkins cultivated by the Romans and in the middle ages were *Curcurbita maxima,* and those of the natives of North America, seen by different travelers in the seventeenth century, were *Cucurbita Pepo.*

ORIGIN OF SPECIES

Dr. Asa Gray in American Journal of Science and Arts, Second Series, Vol. *24*:440-443; 1857, states "Dr. Harris has become satisfied that the North American Indians as far north even as Canada, cultivated squashes and pumpkins, one or both, along with the maize, before the whites were established here." According to Nuttall, the Indians along the whole upper Missouri half a century ago were cultivating *Cucurbita verrucosa.* This common squash is, according to Naudin, a variety of *C. Pepo,* as also is *C. aurantia* (the *C. texana vel. ovifera,* Gray. Pl. Lindh.) which has every appearance of being indigenous in the western part of Texas, on the Rio Colorado and its upper tributaries. At least, this is the opinion of Mr. Lindheimer and of Mr. Charles Wright.

According to George Don, in General System of Gardening and Botany, Vol. *3*: 40, 1834, the native country of *C. maxima* is unknown, that of *C. moschata* is Martinique and that of *C. Pepo* is the Levant.

Origin of Pumpkins and Squashes according to L. Wittmack, Die Heimat der Bohnen und Kürbisse; Bericht. Deut. Bot. Gesell. *6*:374-380, 1888. Favors the American origin.

Naudin believes that all species of *Cucurbita,* e.g. *C. Pepo, C. maxima* and *C. moschata,* originated in the old world. He says in his "Nouvelles Recherches" that *C. Pepo* most likely was known to the Greeks and the Romans. The other two are more modern, as their introduction into European gardens does not date back over two hundred years.

Alphonse de Candolle in his "Origine des plantes cultivées," p. 199, says the native country of *C. Pepo* is America, while on the other hand he believes that *C. maxima* is a native of the old world.

Among other objects Wittmack found seeds of normal size of *C. maxima* and *C. moschata* in old Peruvian tombs. Naudin himself identified some of the smaller seeds as belonging to *C. moschata.* On that account it seems clear that these two species are of American origin.

In the tombs of the old world no pumpkin or squash seeds have ever been found.

No descriptions of any species of Cucurbitaceae written before the discovery of America are in existence; not until the 16th century are such descriptions found. Asa Gray and Hammond Trumbull have tried to prove that the pumpkin was in existence in North America before Europeans entered the continent.

Gray and Trumbull in Am. Jour. of Sci. *25*: 370-379, 1883, 3rd series, state that in the Geographie Botanique not one of the cultivated cucurbits is attributed to America, and a reference to Nuttall's record that the warted squash was grown by the Indians on the upper Missouri is the only mention of any aboriginal cultivation of squashes in North America.

Yet we find abundant evidence, especially as respects North America — (1) that in various parts of the country, remote from each other, the cultivation of one or more species of cucurbits by the Indians was established before those places are known to have been visited by Europeans; (2) that these species or varieties were novel to Europeans, and were regarded by botanists of the

16th and 17th centuries, as well as by the voyageurs and first colonists, as natives or denizens of the region in which they were found; and (3) that they became known only under American names; one of these names (squash) becoming, in popular use, generic, and two others (Macock and Cushaw) surviving as names of varieties into the present century.

Through E. L. Sturtevant, "The History of Garden Vegetables," the American Naturalist *24*: 727-744, 1890, we learn that "The word squash seems to have been derived from the American aborigines, and in particular from those tribes occupying the northeastern Atlantic coast, and seems to have been originally applied to the summer squash, as by Wood (New Eng. Prosp., Pt. II., c. 6.), when he says, "In summer, when their corn is spent, isquotusquashes is their best bread, a fruit much like a pumpkin."

In 1535 Cartier (Pink. Voy. XII, 656) mentions as found among the Indians of Hochelega, now Montreal, "pompions gourds." In 1586 Heriot (Pink. Voy. 12, 596) mentions in Virginia "pompions melons and gourds," and Captain John Smith (Pink. Voy. 13, 33) pompions and macocks; Strachey (Trav. into Va., 72), who was in Virginia in 1610, mentions macocks and pumpions as differing.

If we consider the stability of types, and the record of variations that appear in cultivated plants, and the additional fact that so far as determined, the originals of cultivated types have their prototype in nature, and are not products of culture, it seems reasonable to suppose that the record of the appearance of types will throw light upon the country of their origin. From this standpoint, we may hence conclude that, as the present types have all been recorded in the Old World since the fifteenth century, and were not recorded before the fourteenth and succeeding centuries, *there must be a connection between the fact of the discovery of America, and the fact of the appearance of pumpkins and squashes in Europe.*

DESCRIPTION OF THE GENUS CUCURBITA

Flores monoici. Masculi in axillis foliorum solitarii; corolla campanulata, usque ad medium 5-loba, staminum connectivis ima basi liberis; antheris flexuosis, in columnam cylindricam coalitis vel agglutinatis, apice exappendiculatis; polline magno, globoso, subtiliter muricato, multiporosa. Foeminei pariter solitarii,staminum trium rudimentis instructi, in fundo nectariferi; stylo crasso,

in stigmata 3 biloba vel bifurca papillosa diviso; ovario glabro vel hirsuto, triplacentifero. Pepo saepius magnus, carnosus aut fibrosus, saepe corticosus. Semina ovalia, complanata, margine tumida cincta, vel rarius immarginata.

Plantae utriusque orbis indigenae, herbaceae, annuae aut radice crassa napiformi perennantes; flagellis multimetralibus, humi serpentibus et ad nodos radicantibus, nonnunquam etiam scandentibus. Floribus magnis aut maximis, luteis, peponum carne dulci et tunc eduli aut amara et venenosa.

The members of this genus are annual or perennial, rough-pubescent, almost prickly, trailing, creeping or bushy vines with two-to-many branched tendrils.

Leaf blades, entire or lobed, usually cordate at the base. Fowers showy, solitary, monoecious.

Staminate flowers with campanulate and 5 lobed calyx tube and corolla, the lobes recurved at the ends. Stamens three in number, inserted on the calyx tube. The filaments distinct, anthers linear, cohering, contorted.

Pistillate flowers with calyx and corolla like those described above. Staminodia 3. Pistil 1. Stigma 3-5, each two lobed and papillose. Style short and thick. Ovary one-celled, with three to five placenta. Ovules numerous.

KEY TO THE SPECIES OF CUCURBITA

1. *Annual.* — Leaves with five lobes. Leaf petiole with stiff and prickly leaves. Peduncles of the male and female flowers obtusely 5-angled. Peduncle of the fruit 5 to 8-ridged and deeply furrowed, enlarged next to the fruit. Calyx tube of the male flowers noticeably five-sided._____*C. Pepo*

2. *Annual.* — Leaves more rounded than those of *C. Pepo,* but lobed, dark green, velvet, comparatively soft to the touch. Calyx tube not campanulate. Calyx-lobes large, often leaf-like, of dark green color. Peduncles of fruit 5-ridged, prominently enlarged next to the fruit._____*C. moschata*

3. *Annual.* — Leaves orbicular or kidney shaped, commonly not lobed or with fine short, rounded lobes. Calyx tube of male flowers is campanulate or rather obconical. Corolla tube nearly the same diameter at top and bottom. Peduncle of fruit cylindrical or claviform, soft and spongy at maturity, never ridged._____*C. maxima*

4. *Perennial.* — Leaves large, cordate-triangular, grayish-

pubescent; flowers nearly as large as in *C. Pepo* and similar in shape, the pistillate on a peduncle two to three inches long. Fruit size and shape of an orange, smooth, green, and yellow splashed, not edible.----------*C. foetidissima.*

5. Leaves pale green, often marbled, in outline ovate or suborbicular, cordate at base, roundly 5-lobed and the sinus rounded. Calyx tube short and campanulate. Fruit large, fleshy, round-ovoid, white-striped, the flesh white.----------*C. ficifolia*

6. Leaf blades 3 to 5-lobed, sometimes deeply so. Pedicels over 5 cm. long. Similar to *C. foetidissima* in habit, but more slender. Perhaps a naturalized form of *C. Pepo*.----------*C. texana*

DESCRIPTION OF THE SPECIES

1. *Cucurbita Pepo.* — Stems long and trailing, or short and more or less erect, not inclining under the weight of the fruit;

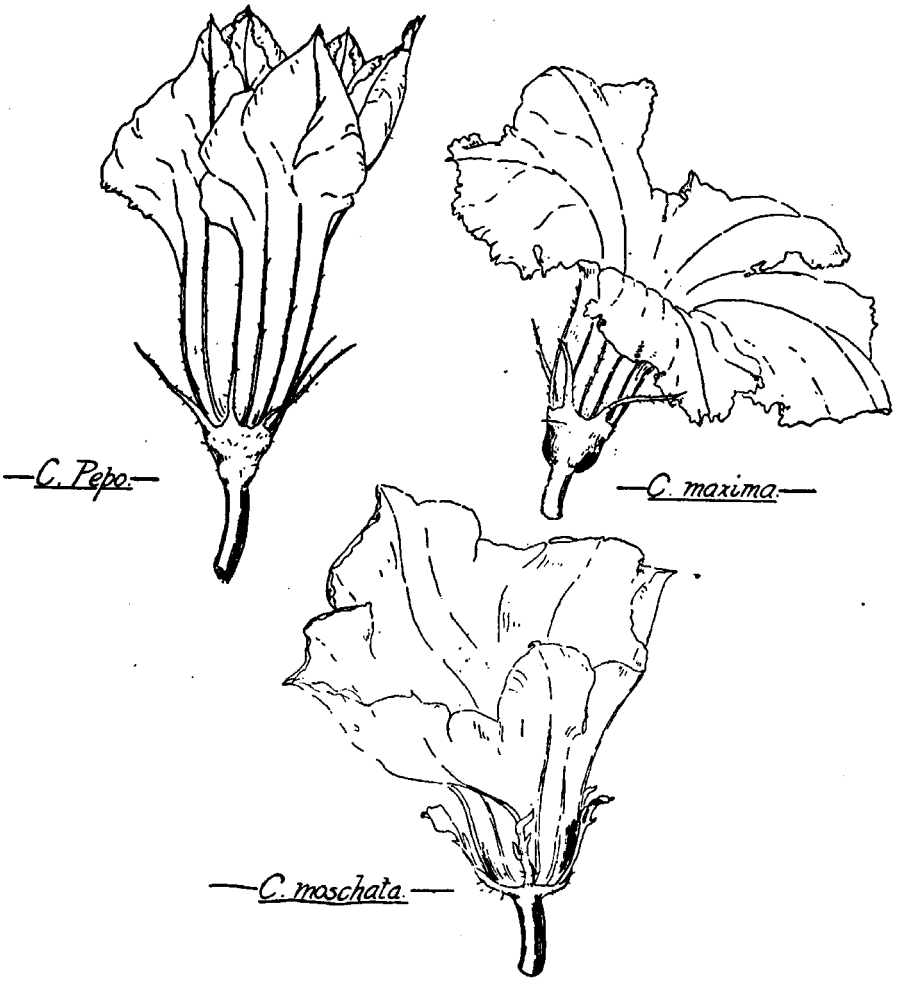

FIGURE 1.

generally polyhedric, with five obtuse angles, often deeply furrowed. The tendrils are ordinarily rudimentary or not at all present in those varieties with short and not running stems. Leaves with five, quite pointed and often quite developed lobes, oftentimes divided into secondary lobes, more or less deeply separated by the sinus. The leaves are generally stiff. Quite frequently the leaves show white triangular spots at the angles of the veins. The leaf, petioles and the underside of the leaves are armed with stiff or prickly hairs. The peduncles of the male and the female flowers are more or less prismatic and obtusely 5-angled. The calyx of the male flowers is quite characteristic. Its tube is noticeably 5-sided, its divisions are generally fleshy and awl-shaped. The corolla is yellow with a little orange. The lobes spread out to some extent. The fruit is extremely variable in form, the dominant type being a reversed ovoid, more or less

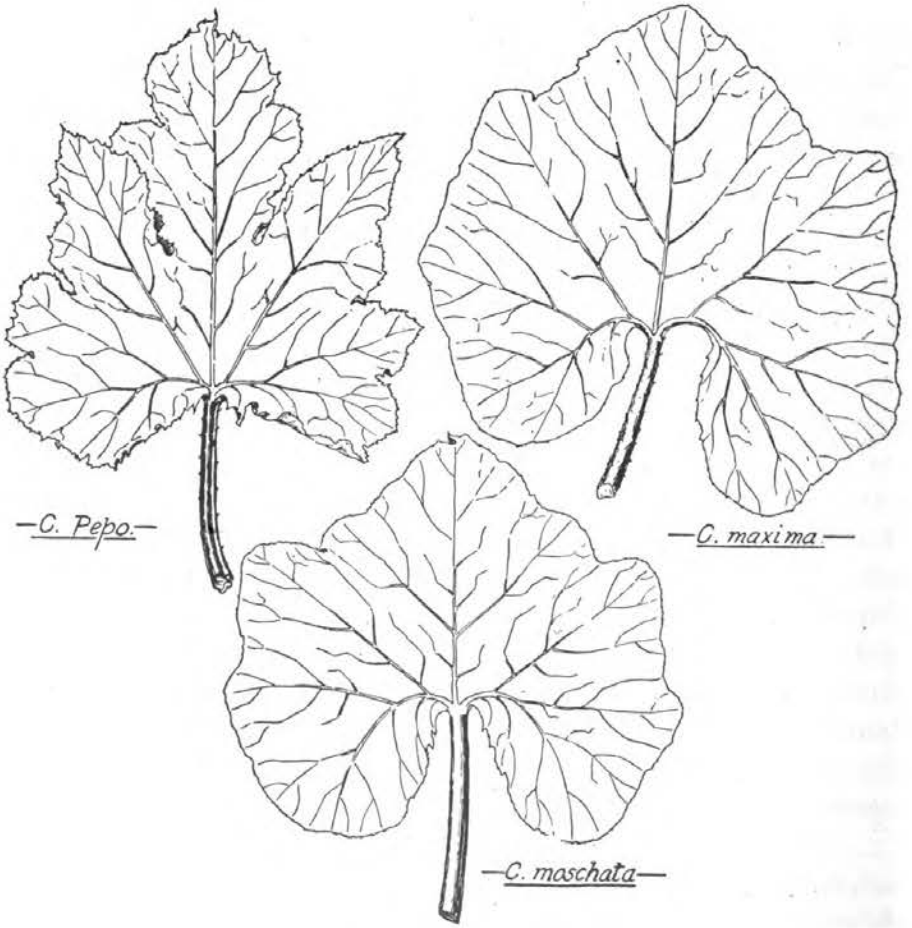

FIGURE 2.

elongated, with or without longitudinal ribs; sometimes smooth. sometimes warty.

2. *Cucurbita moschata.* — The stem of this species has not quite the same diameter as those of *C. Pepo* and *C. maxima.* The stem is nearly cylindrical or slightly 5-sided, and oftentimes shows rather dark spots at the insertion of the petiole. The petioles are cylindrical, with alternate light green and dark green stripes, uniformly hispid, but hardly ever with spiny and prickly hairs. The leaves are of a characteristic dark green, but often they are marked with white triangular spots at the angles formed by the principal veins. The leaves are velvety, or comparatively soft to the touch, round, reniform, denticulately notched at the margin, ordinarily with five or sometimes six sharp lobes, seldom obtuse or rounded, separated by the equally sharp sinus. The male flowers possess very prominent characteristics for this species. While in *C. Pepo* and *C. maxima* the calyx tube is often more or less campanulate, in *C. moschata* the calyx tube is absent or reduced to a sort of plateau, scarcely raised at its borders. The sepals instead of being filiform as among *C. maxima,* or awl-shaped as in *C.Pepo,* are flat, linear, often terminating in one or more lobes, signs of an aborted limb. Oftentimes this limb is developed into a small leaf, more or less rounded and denticular, 10 to 15 millimeters long. The sepals are of a very dark green color which also may be regarded as a special characteristic of this species. The corolla is of a less bright color. The peduncle of the fruit is angular, deeply ridged and swollen where it joins the fruit. The form of the fruit varies to a great extent.

3. *Cucurbita maxima.* — The stems are almost always long and trailing, sometimes short and only a little running, but never upright. Mostly cylindrical or very slightly angled. The leaves are more or less reniform, with five short, obtuse, rounded lobes, oftentimes without any sinus. In some instances the lobes are sharp, but the sinuses which separate them are always little pronounced. The flower peduncle (male as well as female) is cylindrical and not angled. The calyx tube of the male flowers is campanulate or rather obconic, of rounded contour, and does not show any constriction below the point where the sepals are inserted. The sepals are generally narrow, linear, thin, sometimes filiform or totally abortive, very seldom enlarged and not giving the aspect of foliage leaves. The corolla is campanulate, with reflected lobes, generally of a bright yellow color. The peduncle of the fruit is always cylindrical or claviform.

DESCRIPTION OF TYPES AND VARIETIES OF C. PEPO

1. *Thorburn's Connecticut Field Pumpkin.* — Plants with long running stems, five sided, deeply ridged, with stiff hairs. Leaf petiole five sided, from 11 to 13 inches. Leaves 5-lobed, deeply cleft. Male and female flowers long peduncled, length ¾ inch to 1 inch. The fruit is longer than broad, oftentimes ridged, of a golden yellow color.

2. *Summer Crook-Neck Squashes.* — Plants of a bushy character, stems not running. Leaves 5-lobed with stiff hairs. The fruit is decidedly crooked and narrow, the distal part is swollen but terminating in a point, the skin is orange-colored.

3. *Table Queen.* — Stems running, 5-sided, furrowed. Leaves 5-lobed, deeply notched. Short petiole. The fruit is of a dark green (or cream) color, small, deeply furrowed, few in number. Outer skin very hard.

4. *Ferry's Large Yellow Pumpkin.* — Same as No. 1.

5. *Burpee's Golden Oblong Pumpkin.* — Same as No. 1.

6. *Stoke's Big Tom Pumpkin.* — Leaves 5-lobed, not so deeply cleft. No white spots at angles of veins.

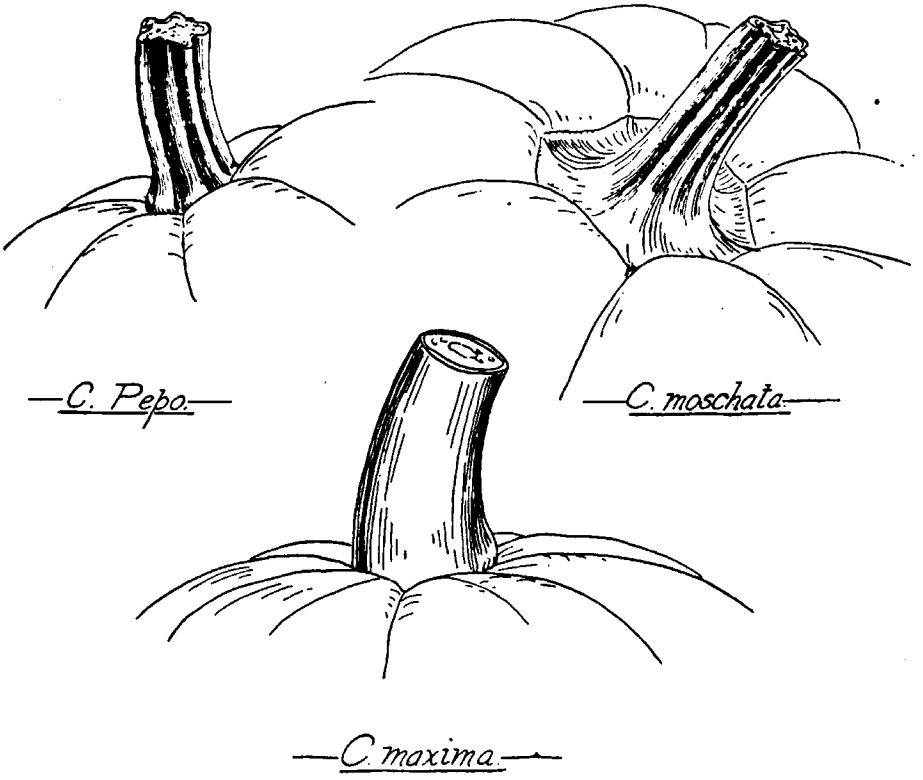

FIGURE 3.

7. *Burpee's Big Tom Pumpkin.* — Same as No. 1.

8. *Stoke's Small Sugar Pumpkin.* — Stems 5-sided, ridged, pubescent. Leaf long, petiolate, 5-lobed, deeply cleft. The lobes divided again. White spots at angles of veins. Fruit ridged, brownish yellow with dark lines. Peduncle of fruit dark green, ridged.

9. *Stoke's Pie Pumpkin.* — Leaves are 3-lobed, not as deeply cleft as is No. 8. The lobes not subdivided, or if so, only to a small extent.

10. *Ferry's Sugar Pumpkin.* — Stems 5-sided, ridged. Leaf 5-lobed, deeply cleft, each lobe again divided. Leaves dark green color, mottled appearance, ridged. Peduncle of fruit deeply ridged.

11. *Burpee's Small Sugar Pumpkin.* — Stems 5-sided, ridged, leaves 5-lobed, each lobe again divided. Peduncle of fruit ridged. Fruit deeply ridged, of a yellow color.

DESCRIPTION OF TYPES AND VARIETIES OF C. MOSCHATA

1. *Thorburn's Cushaw Mammoth Golden Pumpkin.* — Stems almost round, somewhat 5-sided, pubescent, not spiny. Leaves with petioles, from 12 to 15 inches long, pubescent. Leaves almost round, somewhat lobed. Peduncle of fruit angular, deeply ridged, and swollen where it joins the fruit. Fruit of the crookneck type, of a yellow color.

2. *Burpee's Large Cheese Pumpkin.* — Stems nearly round, no ridges, fine pubescent. Leaves almost kidney shaped, no cleft with white spots at intersections of veins. Peduncle of male and female flowers is 5-sided.

3. *Ferry's Cheese Pumpkin.* — Stem is 5-sided to rounded, no ridges, covered with very fine hairs. Leaves almost kidney shaped, somewhat lobed, with white spots at intersection of veins.

4. *Stoke's Sweet Cheese Pumpkin.* — The stem is more or less rounded, not ridged, covered with fine hair. Leaves almost kidney shaped, lobed very little, if any.

DESCRIPTION OF TYPES AND VARIETIES OF CUCURBITA MAXIMA

1. *Burpee's Gen. Mammoth Pumpkin.* — The stems are round, not ridged, covered with fine hairs. The leaves are kidney shaped, not lobed, covered with fine hairs on the under side.

2. *Stoke's King of Mammoth Pumpkins.* — Stems almost round, pubescent, not spiny. Leaves not lobed, no white spot

at intersection of veins. Fruit spherical, flat at both ends, of a yellow color.

3. *Thorburn's Mammoth King Pumpkin.* — Stems almost round, not ridged. Pubescent, not spiny. Leaves not lobed, no white spots in angles of veins. Fruit same as No. 5.

4. *Delicious Squash.* — Stem rounded, not ridged. Leaves not lobed, short petiolate. Flower peduncles short and round, covered with fine hairs. Fruit dark green, pointed at distal end.

5. *Symme's Big Hubbard.* — Stem more or less rounded. Leaf petiole, very long, round. Leaves not lobed, of dark green color. Flower peduncle quite long. Fruit dark green, deeply furrowed and wrinkled, tapering at distal end.

DISCUSSION

In the past, great confusion has existed as to the classification of the squashes and pumpkins grown in the United States, for many pumpkins should have been called squashes and vice versa. By following the key to the species of the genus *Cucurbita,* as given in these outlines, one should have no difficulty in placing pumpkins as well as squashes in the proper species.

CONCLUSION

The writer feels certain that the Mammoth Pumpkins are not pumpkins at all, but squashes belonging to the species *Cucurbita maxima.* Furthermore, he believes that Thorburn's Mammoth Golden Cushaw and Kentucky Field Pumpkins are not pumpkins but squashes belonging to the species *Cucurbita moschata.*

Department of Botany,
Iowa State College.