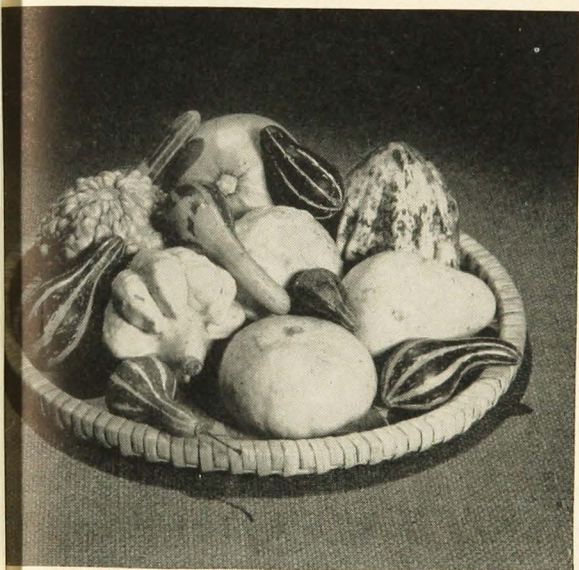


GOURDS



• *Uses*

• *Culture*

• *Identification*

by
A.E. Hutchins
and
L. Sando

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Gourds—Their Culture, Uses, Identification, and Relation to Other Cultivated Cucurbitaceae

A. E. HUTCHINS and L. SANDO

THOUSANDS of years ago primitive man probably used gourds for utilitarian purposes. Later, they were decorated or used in their natural state for ornamental and ceremonial purposes. Hard-shell gourds of the *Lagenaria* genus have been found in Egyptian tombs of 2000 B.C. They are referred to in the Old Testament, and references are made to their use by the ancient Greek and Roman writers. Illustrations in early Herbals picture gourds as being very similar in type to those grown today, indicating that there has been very little change in them for several centuries. The American Indians, ancient and modern, made considerable use of gourds for household utensils, ornaments, and ceremonial purposes. In addition to *Lagenaria* types, they also utilized various gourds belonging to the *Cucurbita* genus.

Gourds, with their great variety of shapes, colors, and uses, have always been fascinating to many people. Recently there has been an increasing popular interest, particularly in the ornamental types. Many inquiries are received as to their identification, culture, and uses, and it is the purpose of this bulletin to present information concerning some of the more commonly grown types and varieties.

All gourds belong to the family, Cucurbitaceae, commonly called the Gourd family. The family consists of about 90 genera containing about 700 species. Most of them are native to the tropical and subtropical regions of the world. Most members of the family are annuals but a few are perennials. All are frost-tender. Among the widely diversified forms included in this family are many with which everyone is familiar. The squash and pumpkin belong to this group and in some regions are called gourds. Muskmelons, cucumbers, watermelons, citron melons, and the West India gherkin are other generally known genera and species. In addition, there are many other forms which are cultivated to a lesser extent. Most of the forms commonly grown and used for ornamental purposes and for various decorative and useful utensils belong to the *Lagenaria* genus and to a sub-

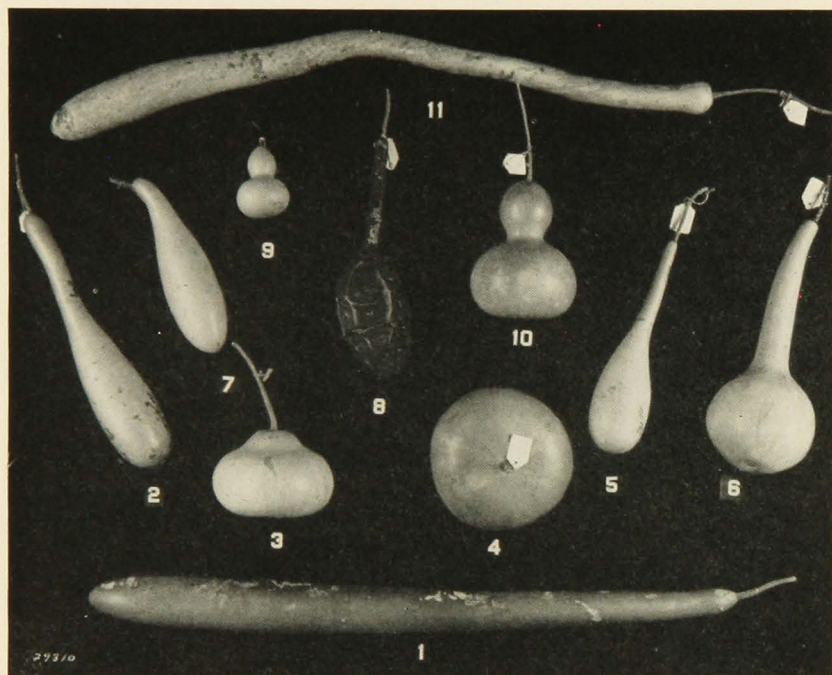


FIG. 1. SOME VARIETIES OF THE LAGENARIA GENUS

- | | | |
|-----------------------------|----------------|----------------------------|
| 1. Hercules Club | 5. Dipper | 9. Miniature Bottle |
| 2. Pipe | 6. Knob Kerrie | 10. Bottle |
| 3. Kettle | 7. Powder Horn | 11. New Guinea Butter Bean |
| 4. Depressed Bottle or Flat | 8. Marankas | |

species of the *Cucurbita* genus, *C. pepo* var. *ovifera* of the pumpkin group. Furthermore, there is a large number of genera and species which are not commonly utilized but are occasionally grown as oddities or curiosities.

Cucurbitaceae Grown for Utensils, Ornaments, or Curiosities

Most of the early part of the following discussion will deal largely with those members of the Cucurbitaceae family which are commonly designated as gourds and which are grown for ornamental purposes, for the making of various utensils, and as oddities or curiosities. The latter part will be devoted largely to a presentation of characters which may be used in identifying the various cultivated Cucurbitaceae in order to coordinate those genera, species, and varieties, commonly called gourds, with other members of the Gourd family.

Selecting and Planting Gourds

ONE OF THE questions commonly asked is, "What kinds of gourds should I attempt to grow in this region?" The answer depends, to a large extent, on the purpose of the grower in growing them and on which genera, species, and varieties are adapted to the growing conditions in his locality.

Among the gourds that are easiest to grow and which, perhaps, should first receive the attention of the amateur grower are those belonging to the *Cucurbita pepo* var. *ovifera* and the *Lagenaria* groups. Both of these grow well at University Farm and produce an abundance of fruits. Both are hard-shell types which keep well if properly matured and cured.

The former group contains a large number of varieties whose fruits vary widely in color and shape and are in great demand for ornamental purposes and, to some extent, for making into various useful articles. While the varieties of the *Lagenaria* group do not have the attractive coloration of the preceding, they also vary widely in shape and, in general, produce much larger fruits which are more useful in the production of many interesting and useful utensils. Often, they are painted for ornamental purposes, and many elaborate and attractive creations can be made, the number depending only upon the ingenuity of the gourd enthusiast.

Some of the squash and pumpkins, such as Turk's Turban, Golden Summer Crookneck, Chinese Red, and others, also are highly colored, attractive, grow well here, and are used for ornamental purposes. However, it must be remembered that they are soft-shell types, are not durable, and, therefore, will not keep well for very long periods. In fact, the fruits of many squash and pumpkin varieties can be used as ornamentals for short periods. The wild cucumber may be grown and its papery mature fruit shells are often useful in gourd arrangements or patio strings. Fruits of *Cucurbita ficifolia*, while not hard-shelled, will keep for a considerable time. That is also true of the citron melon and Honey Dew melon.

These, then, are the kinds that are most likely to be successfully grown and whose fruits are the most desirable because of their attractiveness and durability. However, there are many other kinds that may be grown as oddities, for their attractive-

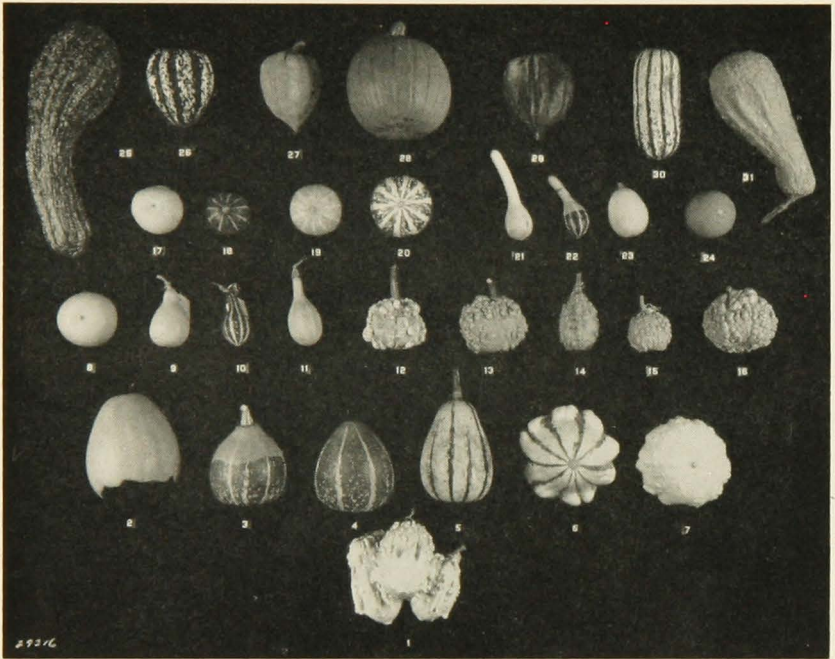


FIG. 2. SOME *Cucurbita pepo* AND *C. pepo* var. *ovifera* VARIETIES

Cucurbita pepo var. *ovifera*

1. Ten Commandments
2. Big Bell
3. Big Bell-Striped Tricolor
4. Big Bell-Striped Bicolor
5. Big Bell (Sometimes called Bishop's Hat)
6. Catalogued as Bishop's Mitre
7. Umbrella
8. Mock Orange, Yellow
9. Yellow Pear
10. Striped Pear (Green and white bicolor)
11. Striped Pear (Yellow Bicolor)
12. Small Warted Hardhead (Green)
13. Small Warted Hardhead (Orange)
14. Warted Pear
15. Small Warted (Tan)
16. Large Warted
17. Yellow Apple

18. Striped Apple (Green)
 19. Onion (Striped Orange and Yellow)
 20. Onion (Striped Green and White)
 21. Spoon
 22. Spoon (Striped Tricolor)
 23. Nest Egg
 24. Mock Orange (Orange)
- Cucurbita pepo*
25. Summer Crookneck (Green Bicolor)
 26. Table Queen (Striped Green and White)
 27. Table Queen (Orange)
 28. Pie Pumpkin
 29. Table Queen (Green)
 30. Delicata (Marketed here as Sweet Potato)
 31. Carabosse or Summer Crookneck (Orange)

ness for screen or arbor, or for purpose of study. In some of these, the fruits are not durable. Such are varieties of *Citrullus vulgaris*, *Cucumis anguria*, *Cucumis sativus*, *Cucumis melo* and its subspecies, and *Bryonia dioica*. In some, the fruits are produced sparsely in this region and are not durable. Among these

are varieties of *Trichosanthes colubrina*, *Momordica charantia*, and *Momordica balsamina*.

In others, the fruits are produced sparsely, if at all, in this region but will keep for fairly long periods. Among these are varieties of *Cucurbita texana*, *Cucurbita ficifolia*, *Cucurbita argyrosperma*, *Cucurbita foetidissima*, *Sicana odorifera*, *Luffa cylindrica*, *Luffa acutangula*, *Benincasa hispida*, *Cucumis dipsaceous*, and *Cucumis metuliferus*. In all of these, the plant grows fairly well here but lack of durability of the fruit or the sparseness of their fruiting is against their use on an extensive scale. However, some of them are effective for screening purposes, others are attractive in the garden, and some appeal through their curious fruit types. The gourd and garden enthusiast will often be well rewarded by growing a few plants in his garden.

Climate

Gourds, like other vine crops, require a warm growing season and will not withstand frosts. They also require a long growing season to develop their fruits to the best advantage. Most of them are annuals, and those that are perennials must be treated as annuals here since they will not withstand Minnesota winters. If possible, they should be planted where they will receive full sunlight for the major portion of the day and where they will be somewhat sheltered from the wind. Protection from strong winds is particularly important where gourds are to be grown on trellises since whipping the vines about is apt to cause severe damage. Like corn, their best development occurs where there are many warm nights as well as warm days. However, many of them, especially those varieties belonging to the *Cucurbita pepo* var. *ovifera* and *Lagenaria* groups, will mature a considerable crop under the climatic conditions generally prevailing in the vicinity of the Twin Cities if they are properly grown.

Soil

Any good soil that is well-drained but retentive of moisture, moderately fertile, well supplied with organic matter, not too acid, and that warms up quickly should produce good crops of gourds. While the soil should be neutral, satisfactory yields are usually obtained where the pH is 6 or above. Where a long growing season prevails, heavy soil types produce the best yields, but

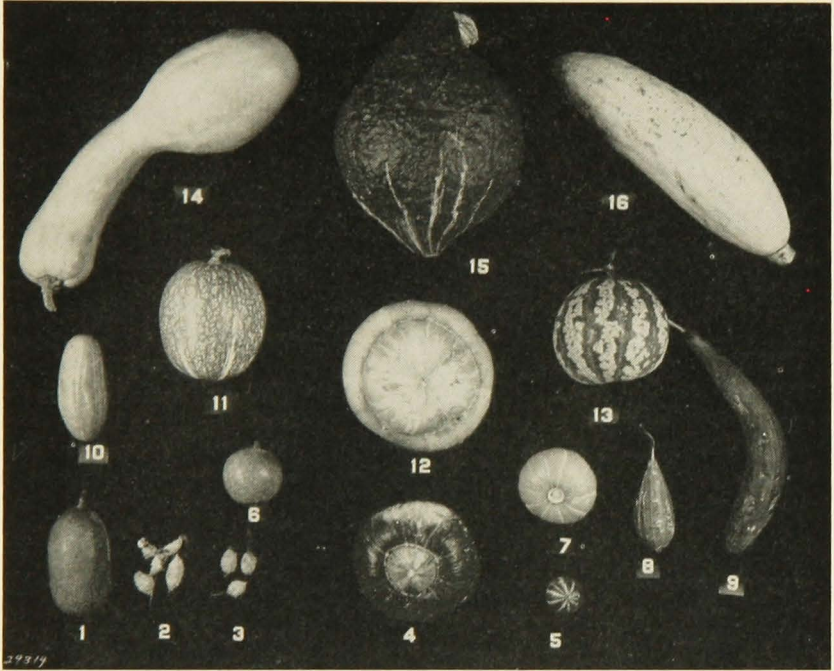


FIG. 3. ADDITIONAL GENERA, SPECIES, AND VARIETIES OF CUCURBITACEAE

- | | |
|---|--|
| 1. <i>Benincasa hispida</i> —Wax Gourd | 9. <i>Luffa cylindrica</i> —Vegetable sponge, rag, dishcloth |
| 2. <i>Momordica charantia</i> —Balsam Pear | 10. <i>Cucumis sativus</i> —Cucumber |
| 3. <i>Momordica balsamina</i> —Balsam Apple | 11. <i>Cucurbita ficifolia</i> —Malabar, Siamese, Angora |
| 4. <i>Cucurbita maxima</i> —Buttercup | 12. <i>Cucurbita maxima</i> var. <i>turbaniformis</i> —Turk's Turban |
| 5. <i>Cucurbita foetidissima</i> —Calabazilla or Missouri | 13. <i>Citrullus vulgaris</i> —Citron |
| 6. <i>Benincasa hispida</i> —Japanese Mammoth or Wax | 14. <i>Cucurbita moschata</i> —Yellow Cushaw |
| 7. <i>Cucurbita maxima</i> var. <i>turbaniformis</i> —Small Red China | 15. <i>Cucurbita maxima</i> —Green Hubbard |
| 8. <i>Luffa acutangula</i> —Dish Cloth | 16. <i>Cucurbita maxima</i> —Banana |

where the growing season is relatively short, light soil types often give the best results. If the soil is not loose, mellow, and friable, it is desirable that plenty of organic matter, such as leaf mold, pulverized peat, green manure, or other like material, be worked well into the soil.

As previously stated, the soil should be moderately fertile. In a region where the growing season is very long, a rich soil would probably produce the largest yields. Too rich a soil, however, tends to promote a large vine growth and to retard fruiting, and in regions, such as this, where the growing season is relatively short, a less fertile soil usually gives the best results. A

shovelful of well-rotted manure is often worked into the soil of the hill before planting to provide nourishment for the plant. If manure is not available, a tablespoon of a complete fertilizer, such as a 5-8-7 or a 4-8-6, may be worked into the soil about the plant at planting time. Later, two more applications of the same amount are sometimes given if the plants do not appear to be growing vigorously. Nitrogenous fertilizers should be withheld after the vines begin to run in order to harden the growth.

Since the root systems of most gourds are extensive but rather shallow, the upper 8 to 10 inches of soil should be well prepared and fertilized to give the best results. All lumps and clods should be broken up, but it is not necessary to have the soil extremely fine. By digging in manure early, or preferably the previous fall especially on heavy soils, it should be possible to work the soil over more than once, thus providing it with ample aeration and an opportunity to become warm before the plants are set out.

Seeds and Planting

It is important to order seeds early. Consult the various catalogs, choosing those varieties that are familiar, those that are well adapted to the locality, and perhaps a few to be grown as oddities. Endeavor to obtain as wide a variety of colors and shapes as possible. It should be remembered, however, that some varieties do not come true to type from seed and that there will probably be some variations in the stock obtained from even the best sources. In spite of this, unless the gardener is restricted as to space, it is preferable to purchase named varieties rather than one of the many mixtures of seed commonly offered by seedmen since these mixtures often produce a large number of undesirable types.

Seeds of the vine crops do not germinate well in cold soils and may rot if too long periods of wet, cool weather prevail after sowing. Neither do the plants withstand frost. Therefore, if they are to be planted out-of-doors, sowing should be delayed until the soil has warmed up and danger of frost is over. In the vicinity of the Twin Cities, they usually should not be planted before the middle of May. Germination often may be hastened and the young plants protected from the cold in the early part of the season by the use of one of the several types of plant protectors available or, to some extent, by the use of inverted flower pots or tin cans. If planting the seed directly in the field, six, eight, or more seeds should be planted to the hill to insure against loss by

poor germination or by destruction of the young plants by insects, disease, or wind. Later, the plants should be thinned to two or three per hill by removing the diseased and less vigorous plants. The seeds should be planted one inch or less deep, the depth depending upon their size which varies greatly with different varieties. Get the seeds down to moist soil but do not cover too deeply.

Most of the gourds require a long growing season, four or five months, to produce a maximum of mature fruits. Therefore, it usually is desirable to start them inside in this region and to transplant the young plants to the field when danger of frost is over and when the weather has warmed up enough so that the young plants will not be severely checked by cool conditions. Sufficiently warm conditions do not usually occur much before May 24 at University Farm, and it often appears that as good or better results would be obtained by waiting until about June 1 to transplant to the garden unless the grower gives them some protection during the cool nights.

Under most conditions, little skill is required in starting the plants from seed indoors. However, vine crops are somewhat more difficult to transplant than most vegetable crops, and it is important that the seedlings do not become too large before transplanting to the field or they may become severely checked or even killed. It is also important that the roots be disturbed as little as possible during transplanting since the vine crops do not recover well from root injuries. Therefore, it is well to sow the seeds in pots, berry boxes, inverted squares of sod, or other similar containers, sowing enough seed in each container to make one hill in the field and then transplanting the plants in each container to the field as a unit at the proper time. Seeds with thin seed coats germinate fairly rapidly and should be planted about two to three weeks before conditions are favorable for setting the plants in the field. Those with thick, hard coats, in general, germinate more slowly and usually may be sown three to four weeks before time of transplanting. The soil in the containers should be moderately light and well-drained. If possible, it is preferable to transplant to the field on a calm, cloudy day. The plants should be watered before setting them out and again after the transplanting is completed. Most of the gourds are rampant growers and it is desirable to give them plenty of space in which to grow. Therefore, the plants or hills should be spaced well apart, at least 6 or 8 feet separating them.

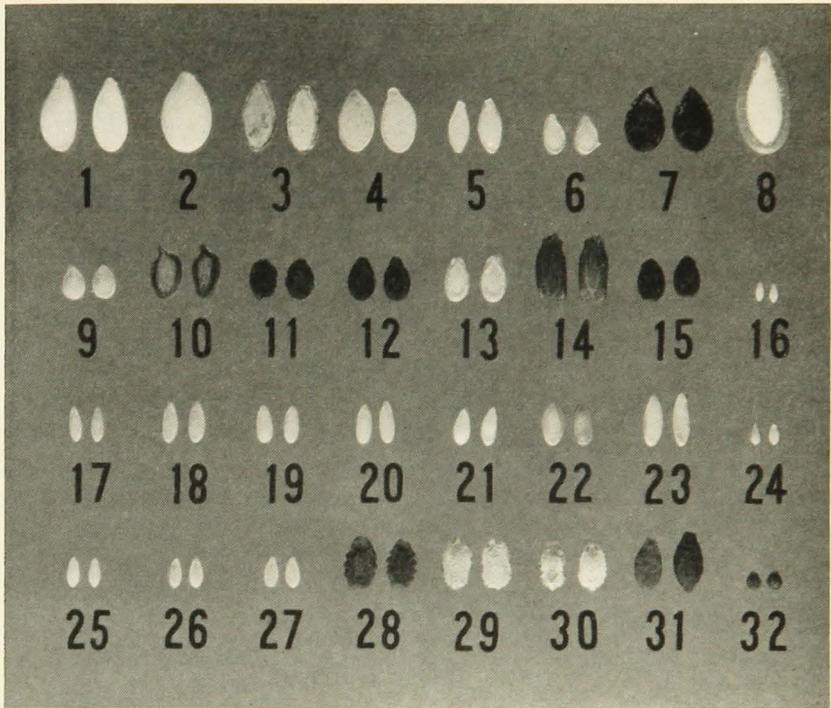


FIG. 4. SEED OF SOME GENERA, SPECIES, AND VARIETIES OF CUCURBITACEAE

1. *Cucurbita maxima*—Golden Hubbard Squash
2. *Cucurbita maxima* var. *Turbiformis*—Turk's Cap
3. *Cucurbita moschata*—Yellow Cushaw Pumpkin
4. *Cucurbita pepo*—Fort Berthold Pumpkin
5. *Cucurbita pepo* var. *ovifera*—Mock Orange
6. *Cucurbita texana*—Native Texas Gourd
7. *Cucurbita ficifolia*—Angora Gourd
8. *Cucurbita argyrosperma*—Silver Seeded Gourd
9. *Cucurbita foetidissima*—Missouri Gourd
10. *Sicana odorifera*—Cassabanana Gourd
11. *Luffa cylindrica*—Dish Cloth Gourd
12. *Luffa acutangula*—Dish Cloth Gourd
13. *Benincasa hispida*—Japanese Mammoth Gourd
14. *Lagenaria siceraria*—Giant Club Gourd
15. *Citrullus vulgaris*—Arikara Watermelon
16. *Cucumis anguria*—West India Gherkin
17. *Cucumis sativus*—Everbearing Cucumber
18. *Cucumis melo* var. *reticulatus*—Benders Surprise
19. *Cucumis melo* var. *cantalupensis*—Cantaloupe de Bellegarde
20. *Cucumis melo* var. *saccharinus*—Sucrin de Tours
21. *Cucumis melo* var. *flexuosus*—Snake Melon
22. *Cucumis melo* var. *inodorus*—Cassaba Melon
23. *Cucumis melo* var. *inodorus*—Honey Dew Melon
24. *Cucumis melo* var. *chito*—Vine Peach
25. *Cucumis melo* var. *dudaim*—Dudaim Melon
26. *Cucumis melo* var. *conomon*—Oriental Pickling Melon
27. *Cucumis metuliferus*—African Horn Cucumber
28. *Trichosanthes colubrina*—Snake or Serpent Gourd
29. *Momordica charantia*—Balsam Pear
30. *Momordica balsamina*—Balsam Apple
31. *Echinocystis lobata*—Wild Cucumber
32. *Bryonia dioica*—Bryony

Trellis or Ground?

Most of the gourds produce a rampant, rapid vine growth which covers large areas in a short time. While they grow well either when permitted to run on the ground or when trained on a trellis or arbor, there are several things that should be considered in determining which method should be used.

If space is limited, more kinds or plants can be grown by training the vines on a trellis. In addition, the fruits are apt to be more highly and more uniformly colored, more symmetrical, and less blemished if grown on a trellis than when permitted to lie on the ground. On the other hand, the trellis method of culture involves more labor and is somewhat more expensive. Also, some of the gourd fruits, such as those of the Serpent, Calabash, Marankas, and others, do not develop the curious crooknecks so much desired if grown on trellises. However, with a little manipulation and training of the young pliable fruits, they can be made to grow in the desired shape, and their appearance may be considerably better than those allowed to develop naturally on the ground.

If a fence or trellis is used, it should be made firm and strong enough to support the heavy weight of the gourds when they have reached maturity. Heavy, coarse mesh poultry netting makes an excellent trellis material, but care should be taken to see that the fruits do not become misshapen by being permitted to grow through the openings in the netting. If the vines are grown on a support, they must be trained somewhat and tied. Soft string or raffia should be used for this purpose, and care exercised to prevent injury to the finer and softer parts. Such injury is easily caused by the use of improper tying material and by carelessness in tying the vines to the support.

Cultivation

Gourds do not require a very great amount of cultivation. Because of their shallow root systems, cultivation, in general, should be very shallow and should be done only often enough, in most instances, to control the weeds. Some hand hoeing or weeding may be necessary after the plants have started to vine, particularly if the trellis type of culture is used. When the plants are permitted to run on the ground, most varieties produce large enough vines to cover the surface fairly well and will usually

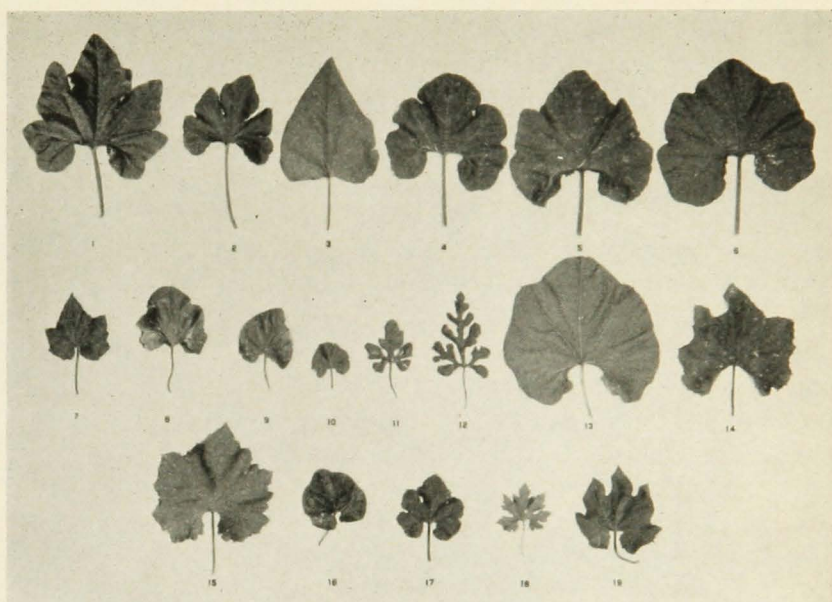


FIG. 5. LEAF TYPES OF SOME GENERA, SPECIES, AND VARIETIES OF CUCURBITACEAE

- | | |
|---|--|
| 1. <i>Cucurbita pepo</i> —Delicata | 10. <i>Cucumis melo</i> var. <i>conomon</i> — Oriental Pickling Melon |
| 2. <i>Cucurbita pepo</i> var. <i>ovifera</i> — Mock Orange | 11. <i>Cucumis anguria</i> —West India Gherkin |
| 3. <i>Cucurbita foetidissima</i> | 12. <i>Citrullus vulgaris</i> —Favorite Honey |
| 4. <i>Cucurbita ficifolia</i> —Angora | 13. <i>Lagenaria siceraria</i> —Knob Kerrie |
| 5. <i>Cucurbita moschata</i> —Yellow Cushaw | 14. <i>Luffa cylindrica</i> —Vegetable Sponge |
| 6. <i>Cucurbita maxima</i> —Buttercup | 15. <i>Luffa acutangula</i> —Dish Cloth |
| 7. <i>Cucumis sativus</i> —Mincu | 16. <i>Trichosanthes anguina</i> —Snake or Serpent |
| 8. <i>Cucumis melo</i> var. <i>reticulatus</i> — Benders Surprise | 17. <i>Benincasa hispida</i> —Wax |
| 9. <i>Cucumis melo</i> var. <i>Dudaim</i> — Ornamental Pomegranate | 18. <i>Momordica charantia</i> —Balsam Pear |
| | 19. <i>Sicana odorifera</i> —Cassabanana |

crowd or shade out most of the weeds in the latter part of the growing season.

Watering

Gourds require an ample supply of moisture, particularly during the early part of the growing season and when the small fruits are beginning to enlarge. However, they do not like wet feet and, while the soil should be kept moist, it should not remain soaked for very long periods. It is desirable to water only occasionally (depending, of course, upon the prevailing weather conditions) but to give them a thorough soaking each time water

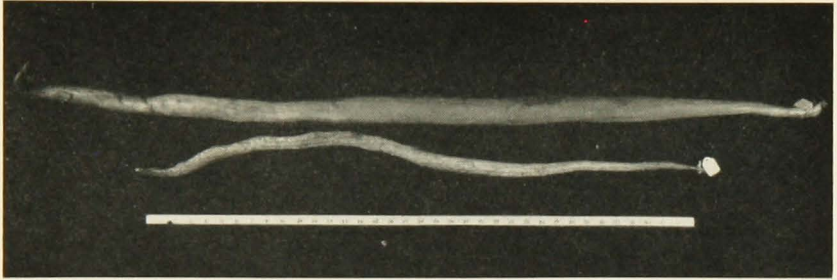


FIG. 6. *Trichosanthes anguina*—SERPENT GOURDS GROWN IN THE GREENHOUSE

is supplied. In watering, do not sprinkle the vines and foliage any more than is necessary since such sprinkling encourages mildew, discourages the insects which are necessary for pollination, and may ruin considerable amounts of pollen. Avoid watering any more than is necessary late in the season. At that time, the vines have developed extensive root systems which enable them to withstand drier conditions than they could earlier in their development. Such conditions are better, also, for maturing the fruit. Watering late in the season also tends to encourage mildew which is often destructive.

Insects and Diseases

The striped cucumber beetle, feeding on the vines, flowers, and immature fruits, often kills the young plants and causes serious damage to the older ones. It also spreads mosaic and bacterial wilt diseases which may be very destructive. Control measures must be thorough. Dust the plants, especially under the leaves, with a mixture of 1 pound of calcium arsenate to 8 pounds of gypsum. Start dusting as soon as the insects appear and keep the plants covered with the mixture as long as the beetles are present. Rotenone and pyrethrum compounds may also be used and while more expensive often give better control. In home gardens, the young plants are sometimes protected by screening. All refuse should be destroyed after harvest. The 12-spotted cucumber beetle may be controlled in the same manner.

The aphid (plant louse) occasionally is troublesome, causing the leaves to curl, turn brown, and die. Control by spraying with a solution made up in the proportion of 1 gallon of water, 1¼ teaspoons of 40 per cent nicotine sulphate, and 1 ounce of soap

just as soon as the insects appear and every 7 to 10 days thereafter, if necessary. Pyrethrum sprays or dusts are also effective.

The squash bug sometimes is very destructive. The mature bugs are not readily killed by insecticides and should be hand-picked. They gather under boards or shingles scattered throughout the field. Early in the morning the bugs should be removed from under the boards and killed. On small plots handpicking the young bugs also aids in their control. The young bugs may be killed by dusting or spraying with pyrethrum. Mixtures of pyrethrum and rotenone are also effective. The spray or dust should be applied during the heat of the day and the coverage should be thorough since the poison must come in contact with the insect to be effective. Applications should be made as soon as the bugs appear and continued at intervals of a few days as long as young bugs continue to appear. After the crop is harvested all refuse should be destroyed.

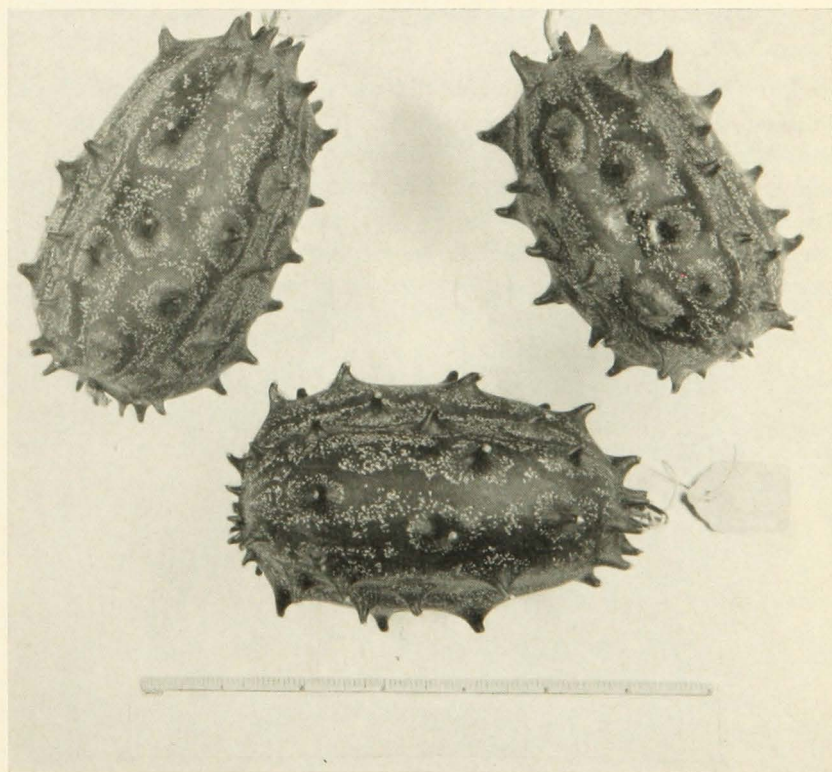


FIG. 7. *Cucumis metuliferus*—AFRICAN HORN OR HORNED CUCUMBER GROWN IN THE GREENHOUSE

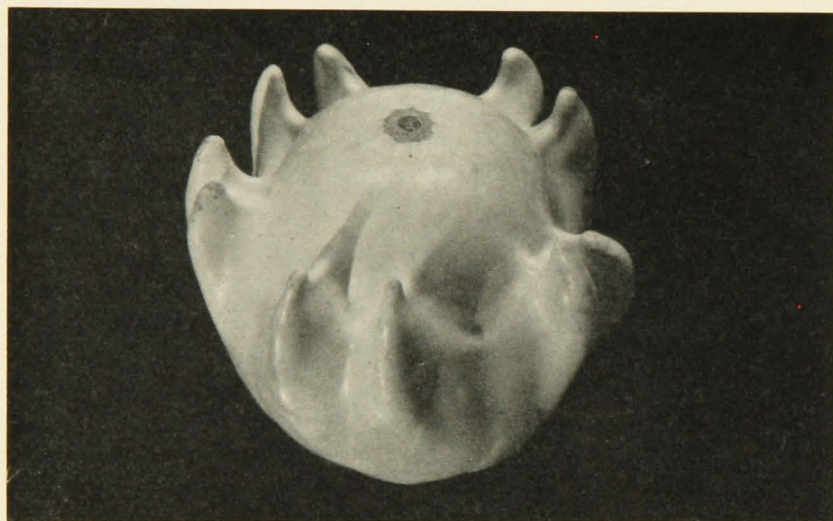


FIG. 8. *Cucurbita pepo* var. *ovifera*—TEN COMMANDMENTS

Mosaic is a very destructive disease of some of the vine crops, causing the leaves to become mottled, stunting the plants, and decreasing the yield. Control by destroying such weeds as milkweed, wild cucumber, catnip, and pokeweed which harbor the disease over winter; by keeping the plants as free of cucumber beetles and aphids as possible; by destroying all diseased plants as soon as they appear; and by growing the plants in a rotation in which vine crops are not grown more than once in five or six years on the same ground.

Bacterial wilt is another destructive disease of some of the vine crops which causes the plants gradually to wilt and die. Control by destroying the cucumber beetles and aphids and by destroying all diseased plants as soon as the disease appears.



Harvesting and Curing Gourds

Since most gourds need the complete growing season to mature their fruits and the fruits do not cure well unless mature and since the colored gourds are not fully colored until mature, they should be left on the vines as long as possible.

While the soft-shell types, such as the Turban, should be taken in before the first hard frosts, the Lagenarias, the hard-shell, colored ornamental types, and the Luffas may be left on the vines until after the first frosts. In fact, such kinds are said to be benefited by light frosts, the fruits maturing much quicker than those not subjected to the low temperatures and thus improving their keeping qualities.

The colored ornamental gourds often mature much of their fruits before frost, and maturity can be identified by pressing the fruit with the thumbnail. If the skin is hard and unyielding to thumbnail pressure, the fruit is close to maturity and may be removed. Lagenaria fruits should be picked when the fruit and stem have turned a light brown.

In removing the fruits, it is advisable to cut them from the vines with pruning shears or a sharp knife allowing two or three inches of stem to remain attached to the fruit. This aids in their

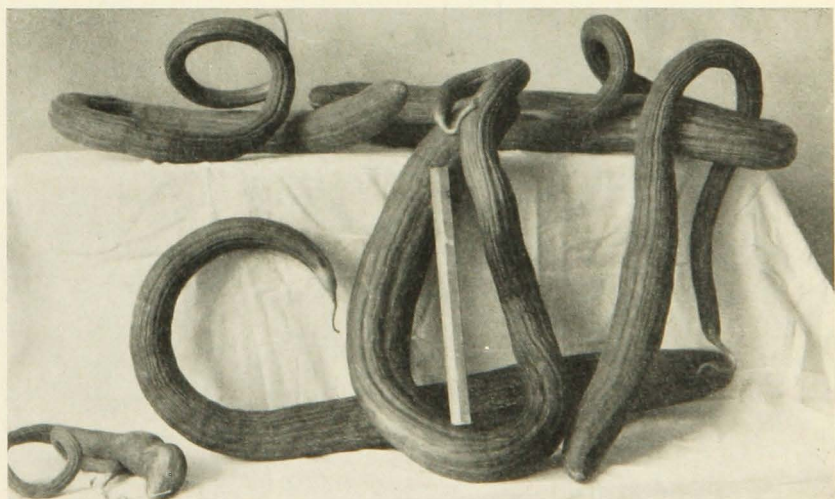


FIG. 9. *Cucumis melo* var. *flexuosus*—SNAKE MELON

preservation and may be of advantage when making them into various articles.

The fruits, particularly those of the small ornamental types, should be handled very carefully as any bruise or puncture in the skin may permit the entrance of infectious organisms causing decay or may mar their appearance. Harvest only those gourds that appear to be mature or very nearly mature since immature fruits are not apt to cure and keep well.

Curing

After harvesting, the fruits should be cured in a light, warm, dry, well-ventilated place for several weeks before finally preparing them for use if the best results are to be obtained from them. It is necessary to keep them dry at all times. Occasionally a disease which causes spots to appear on the fruit surface will lessen their value if they are to be decorated. However, if they are to be used in the natural state or merely polished, waxed, or covered with a clear shellac or varnish, the disease often forms intricate patterns on the surface which are interesting and enhance the value of the fruit to many people. The disease also appears to hasten the curing process. To prevent this and other skin diseases, it is often recommended that the fruits be washed with a borax or sylpho-naphtha solution as soon as harvested.

All gourds that are severely bruised or immature should be discarded and the rest should be wiped carefully with a soft dry cloth and either hung up or stored one layer thick during the drying period. If stored in layers, the fruits should be turned over from time to time to insure even coloration and to prevent formation of molds on the lower side.

It is said that drilling small holes in the end of the fruit hastens the curing process. Where possible and where it does not interfere with the use to which the fruit is to be put, a small hole may be made in the fruit and the core removed. This is often done with *Lagenaria* fruits which are to be used for bird houses, bowls, and similar purposes. If properly cured, the cucurbitas should last at least three or four months, and the *Lagenarias* often last several years.

Preparing and Decorating Gourds

Gourds to be polished or decorated should be washed thoroughly with a soft cloth or brush and then dried. Lagenarias and other hard-shell gourds should be rubbed down thoroughly with pumice or fine steel wool to remove rough areas and to prepare the surface if they are to be painted. Sandpaper should not be used for this purpose. Where the gourd is to be cut open, the cut should be made, the seeds taken out, and the inside scraped out with a spoon and rubbed down lightly with steel wool before the fruit is decorated. All cutting, gluing on of legs or handles, putting on hinges, and other similar processes should be completed before designs are applied. Cut edges may be polished lightly with fine sandpaper.

If the gourd is to be hung up, a hole should be burned through the neck by which to hang it. This may be done with a heated wire or hatpin. The fruit should not be hung up by the fruit stalk or peduncle since that is very apt to separate from the fruit when the fruit becomes mature if any pressure is exerted upon it. After the fruits are well prepared, decoration can be undertaken.

The colored gourds and some of the Lagenarias are rather decorative in the natural state. However, their natural beauty often can be preserved longer or enhanced by certain treatments, and many people get a great amount of pleasure in the development of odd and often beautiful effects.

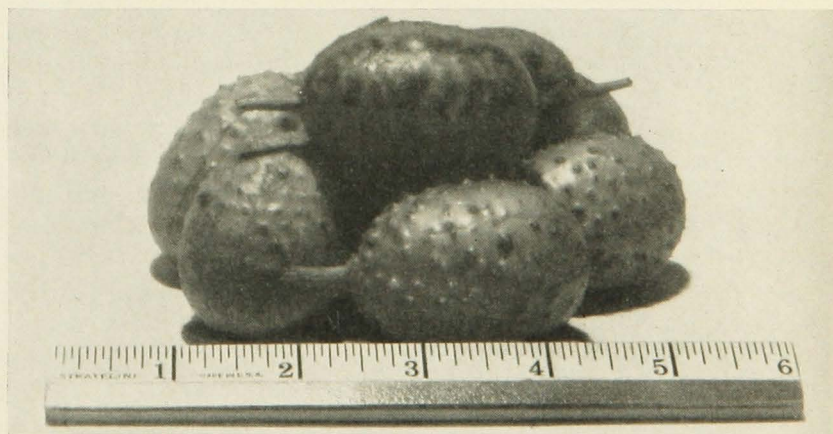


FIG. 10. *Cucumis anguria*—WEST INDIA GHERKIN

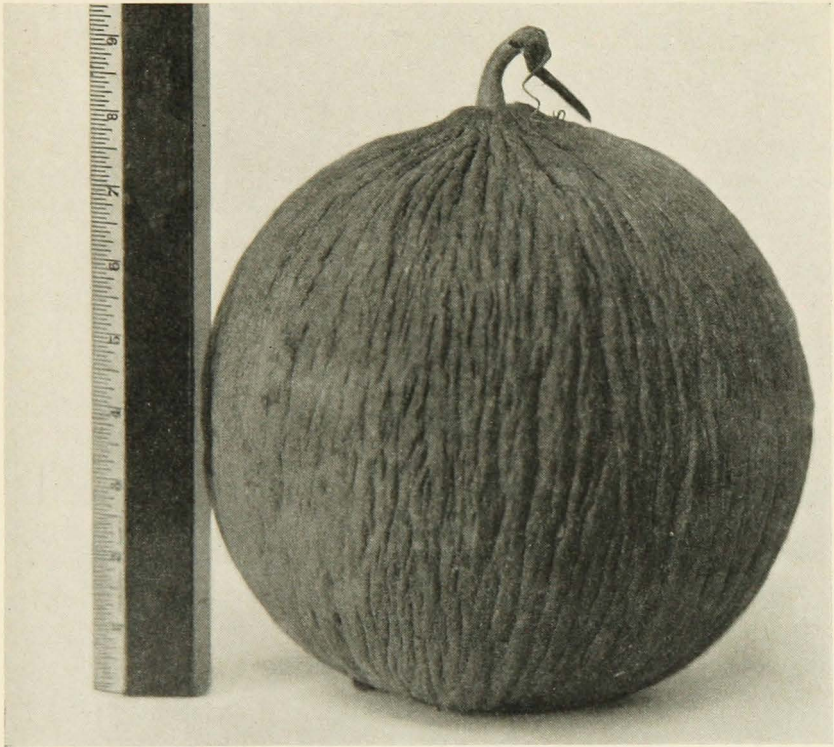


FIG. 11. *Cucumis melo* var. *inodorus*—CASSABA MELON

The colored gourds often are treated to give them a polish and to accentuate their coloring. It is doubtful if a preferred material to use for polish exists since so much depends upon the personal taste of the decorator. Many of the materials commonly recommended have been used in an attempt to choose one which would be easy to apply, rapid drying, and inexpensive. Floor varnishes, waxes of several kinds, shellac, and water wax have been used. A bright polish results from the application of a varnish of any kind, but the shine can be reduced by a mixture of a flat and a gloss varnish in about equal portions.

Varnishes must be fresh and the gourds dry when the varnish is applied, otherwise the gourds are apt to become sticky, a condition which may persist for several days. White varnish merely heightens the natural color of the gourds. It does not change it as do ordinary varnishes or shellac. However, white varnish is somewhat more expensive to use. Shellac may be used and it

produces a somewhat similar effect to floor varnish.

A material that is easy to use and that merely accentuates the natural color of the gourds and at the same time produces a slight gloss is water wax. This is inexpensive and dries within a few minutes. Additional applications can be made if desired but, after each coat of water wax applied with a soft cloth or brush, the gourds must be rubbed gently with a soft dry cloth. This will bring out the colors while each further application will intensify the gloss.

If it is intended to paint the fruits a solid color or to paint designs on them, a coating of shellac should be first applied since, otherwise, a part of the paint will be absorbed by the fruit, especially if the gourds are not absolutely dry. A good grade of enamel should be used for painting. If designs are to be used, the design should usually be drawn with a pencil and then filled in with the enamel. The number, variety, and attractiveness of the designs depend only upon the ingenuity of the decorator. However, since the gourd is commonly associated with Indian lore, designs such as those used on Indian blankets and pottery are used often and are very effective. Designs are sometimes carved and the carving filled with colors producing valuable and attractive specimens.

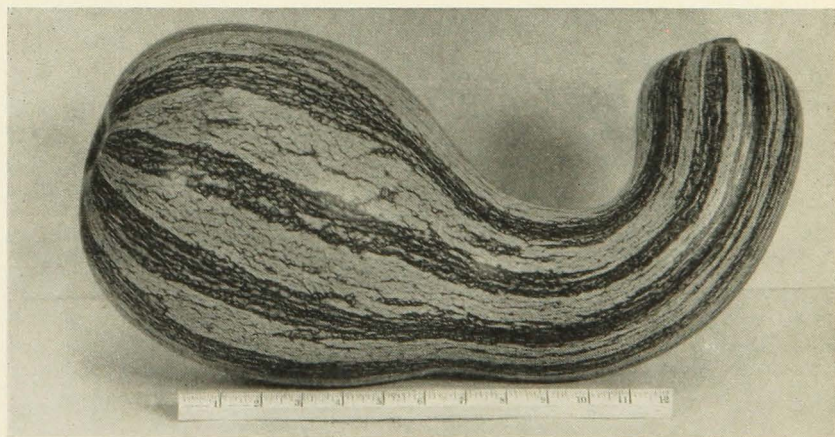


FIG. 12. *Cucurbita moschata*—STRIPED CUSHAW



FIG. 13. *Cucumis melo* var. *chito*—VINE PEACH

Note: Figures 9 through 13 were furnished through the courtesy of the J. C. Robinson Co., Waterloo, Nebraska.

Designs are sometimes traced on the fruits and the designs then burnt in with an electric needle, wood-burning stylus, or red hot wire. This method seems to be increasing in popularity, thus reviving an art which was rather popular some years ago. After the designs have been completed, the fruit should be waxed or shellacked. It is said that an attractive mottled effect, graduating from light to deep brown, can be produced by slowly turning the mature *Lagenaria* fruit over a flame.

Another method of decorating gourds, *Lagenaria* types in particular, is one which may not give as attractive results but often furnishes a lot of fun to growers. In this method, all that is needed is a small, sharp-pointed piece of metal and some small, immature fruits growing on the plants. Various designs can be scratched on the immature fruit skins. As the fruits enlarge, the wounds heal over and enlarge with the fruit. When the fruit is mature, the design is already complete. Such a method is not highly recommended, but it does take quite a lot of skill and foresight to be able to work on the young fruits and visualize the final results. It also is a method out of which children derive a lot of pleasure and some educational information.

Uses of Gourds

The enthusiast finds many uses for gourds. Considerable interest is being shown in their use for decorative material at present, as many attractive arrangements can be devised. Since much pleasure is obtained from the development of one's own displays, only a few suggestions will be given in this paper. Gourds of contrasting colors arranged on copper plates by themselves or with autumn leaves or placed in old gold or brown dishes make very interesting center pieces. Metal or wooden bowls, flat trays, and mirrors are often used for the same purpose (back cover). Dishes made out of some of the larger gourds, such as the Sugar Trough, Depressed Bottle, or Kettle, make attractive containers also. Baskets of the Spanish, Indian, or Mexican type are often used. Small, highly colored gourds are very effective for use on Christmas trees, wreaths, sprays, or swags. An interesting use of gourds is in the so-called Patio or Charm strings.

The Charm string descends to us from the days of the early Spaniards in California who considered it a necessity for one to be hung by the front entrance of the home to insure the welfare of the guests. These strings are made by tying different colored gourds to a central continuous string of the desired length held together by raffia or string. Other materials such as cones, feathers, small clay ornaments, Indian corn, and the pods of milkweed, baptisia, lotus, and peppers are often worked into the strings and add to their attractiveness. If these are not available, many other local materials could be used.

Gourds also can be made into an infinite number of useful utensils (cover). Some of the large types, either decorated or plain, may be made into bowls, jardineres, dippers, bird houses, and other like utensils. Small rings, cut from the necks of the *Lagenaria* type, make attractive napkin rings for the summer cottage. Smaller types may be used for jewel boxes, button boxes, and the like. Many of them make attractive holders for small plants or winter bouquets. In fact, the number of things which can be made from them depends only upon the resourcefulness of the artisan.

Gourds may be used for plant screens on porches, arbors, trellises, or fences. For this purpose, the *Lagenarias* usually pro-

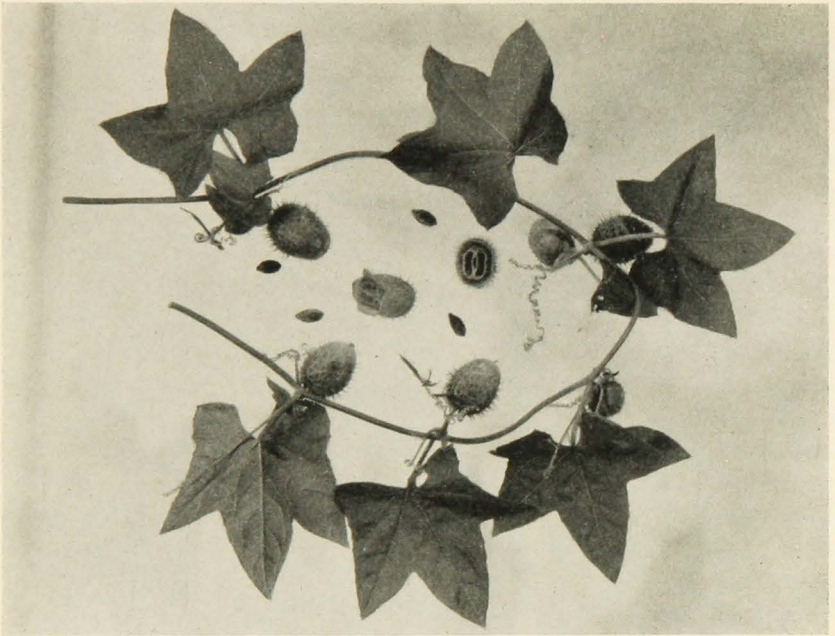


FIG. 14. *Echinocystis lobata*—WILD CUCUMBER

duce the most rapid and largest growth. However, the others are usually satisfactory for most purposes. Such a use enables one also to try out a few of the odd types or curiosities which, although they may not produce much fruit in this region, usually produce fairly large vines. Not only will the vines serve as a screen, but the flowers and fruits growing on the vines at the same time are attractive.

20

Natural Crossing in Vine Crops

Questions often arise as to the possibility or probability of natural crossing in the field between various genera and species of vine crops. Varieties within a species cross readily but

1. Genera will not cross so far as is known.
2. In general, species do not cross.
3. Cucumbers do not cross with muskmelons, watermelons, pumpkins, squashes, or any of the other species mentioned.
4. Muskmelons do not cross with watermelons, cucumbers, pumpkins, squashes, or any of the other species mentioned in this paper but will cross fairly readily with the subspecies of *C. melo*.
5. Watermelons cross readily with the citron melon but not with any of the other species mentioned.
6. Pumpkins (*C. pepo*) do not cross with squashes (*C. maxima*) nor with any of the other species mentioned with the exception of *C. moschata*. However, they will cross rather readily with varieties of *C. pepo* var. *ovifera* and with the so-called bush or summer squash varieties.
7. Pumpkins (*C. moschata*) have been crossed with pumpkins (*C. pepo*) and squash (*C. maxima*) artificially but only with difficulty, and investigators state that there is very little danger of crossing under field conditions. *C. moschata* does not cross with the other species mentioned.
8. Squashes (*C. maxima*) do not cross with the other species mentioned except as discussed above. However, varieties of *C. maxima* will cross readily with varieties of *C. maxima* var. *turbaniformis*.
9. There is a possibility that the two species of the genus, *Luffa*, may cross with each other.
10. So far as is known by the authors, other genera mentioned in this paper do not cross with each other nor do species.

Therefore, one variety of each genus and, in general, one variety of each species may be planted in adjacent rows in the field with no danger of natural crossing and consequent hybrid mixture.

Identification and Classification

It is not the purpose of this paper to attempt to go into a detailed, technical description of the various members of this large and interesting family. Rather, it is the intention to present, by brief description and illustration, some of the differential characters by which many of the members of the Cucurbitaceae family, adapted to cultivation in this region and a few not so well adapted, may be distinguished from each other. Not only the ornamental hard-shell gourds are included in this discussion but also a number of edible types and some soft-shell inedible types as will be noted in the following brief descriptive classification.

Family: *Cucurbitaceae* (Gourd family). Mostly tendril-climbing vines. Chiefly annuals, a few perennials. Frost-tender. Grown for edible fruits and for ornamental purposes. In most members of the family, the plants are monoecious, but some are andromonoecious and a few have perfect flowers.

Genus: *Cucurbita*. Mostly annuals. Probably native of tropical America. Large, yellow, single blossoms borne on long peduncles. Plants usually monoecious. Tendrils two or three forked. Fruits variable in size, shape, color, and skin configuration. (See figures 2, 3, 4, 5, 8, and 12.)

Species: *C. maxima*. True or winter squash. Seed color usually solid white but sometimes brown or bronze. Seed scar slanting. Fruit stem soft, spongy, not noticeably furrowed or ridged, and often enlarged at its attachment to the fruit. Leaves rounded or kidney-shaped, not lobed or only slightly lobed, and of a solid color without spots. (See figures 3, 4, and 5.)

Horticultural varieties: Green Hubbard, Blue Hubbard, Golden Hubbard, Kitchenette, Buttercup, and Banana are some of the varieties most commonly grown for food.

Subspecies: *C. maxima* var. *turbaniformis*. Turban gourds and squash. Growth habit similar to *C. maxima*. Fruit small, drum-like, flattened, distinguished from other members of *C. maxima* by the acorn or protuberant ovary. (See figure 3.)

Horticultural varieties: Turk's Cap, Turk's Turban, Large-fruited Acorn, French Turban, Red China, etc. While these are edible, a number of them are commonly grown for ornamental use.

Species: *C. moschata*. Commonly called pumpkins but belong to a different species than the pumpkins usually grown in this region. Seed color is grayish-white to tan; seed scar slanting, rounded, or horizontal; and the distinct wavy margin is deeper in color and has a different texture than the body of the seed. Fruit stem may resemble either *C. maxima* or *C. pepo*. However, if the fruit stem is distinctly five-sided, hard, and grooved, it usually has a flaring at-

tachment to the fruit; if it is roughly cylindrical, it usually differs from *C. maxima* in being hard and in not being noticeably enlarged at its attachment to the fruit. Leaves, while similar to *C. pepo*, are not deeply lobed, indented, or prickly, and usually have white or light colored spots on them. (See figures 3, 4, 5, and 12.)

Horticultural varieties: Cushaw, Japanese Pie, Tennessee Sweet Potato, Quaker Pie, and others. Used for culinary purposes.

Species: *C. pepo*. Pumpkins and so-called Summer squash. Seeds usually tan colored with horizontal or rounded scar and having a margin the same color and texture as the body of the seed. Fruit stems are distinctly five-sided, grooved, hard, and not noticeably enlarged at the attachment to the fruit. Leaves pointed, deeply lobed, prickly, and usually without lighter spots. Usually vining but some are bush types. Fruits vary from moderately soft to hard shell; color varies in kind and pattern; size varies from a few ounces to one hundred pounds or more; surface varies from smooth to rough or warty. (See figures 2, 4, and 5.)

Horticultural varieties: Winter—Sugar Pie, Small Pie, Winter Luxury, Delicata, Table Queen, Connecticut Field (Stock), etc.; Summer—Bush Scallop (Patty Pan), Golden Summer Straight Neck or Crookneck, Vegetable Marrows, Zucchini, and others. Grown chiefly for culinary use although some, such as Table Queen, Golden Summer Crookneck, Patty Pan, and others, are used sometimes as ornaments for short periods.

Subspecies: *C. pepo* var. *ovifera*. Yellow-flowered gourds. Contains many of the most ornamental hard-shell gourds. Members of the botanical variety, *ovifera*, usually have smaller foliage, vines, and fruit than do the edible varieties of *C. pepo*, and the fruit shell is usually harder and more lasting or durable. (See figures 2, 4, 5, and 8.)

Horticultural varieties: Ten Commandments (sometimes called Holy, Finger, or Crown of Thorns), Bell, Bishop's Hat, Bishop's Mitre, Umbrella, Mock Orange, Pear, Warty Hardhead, Apple, Onion, Spoon, Nest Egg, Ladle or Scoop, Broad Striped, etc.

Species: *C. Texana*. Native Texas Gourd. Very similar to *C. pepo* var. *ovifera* and possibly could be classified as such. Erwin of the Iowa Agricultural College states that the preponderance of evidence, to date, indicates that *C. Texana* is the prototype of our cultivated forms of *C. pepo*. Foliage prickly. Leaves more or less five-lobed. Flowers yellow. Fruits vary from round to pear-shaped; mottled green with light or yellowish-green spots and stripes; hard-shelled. Fruits are produced sparsely in this region. Seeds small, tan-colored. (See figure 4.)

Species: *C. ficifolia* (or *C. melanosperma*). Malabar Gourd. Large vigorous vine. Leaves nearly kidney shaped and five-lobed. Said to be perennial but may be grown as an annual. Fruits sparsely in this region. Flowers yellow. Seeds black. Fruit mottled green with white stripes and with hard gourd-like rind; will keep for a considerable time; flesh white and edible but not particularly appetizing. (See figures 3, 4, and 5.)

Horticultural Varieties: Malabar, Angora, Siamese.

Species: *C. argyrosperma*. Vine growth, foliage, and fruit very similar to *C. ficifolia* and may be merely a variety of it. However, the seeds are different, being very large with a white body and broad, silvery-gray margins. Fruits sparsely in this region. (See figure 4.)

Horticultural variety: Silver-seeded Gourd.

Species: *C. foetidissima*. Missouri, Calabazilla, or Fetid Gourd. Perennial grown as an annual. Fruits sparsely in this region. Leaves gray-green, triangular-ovate, large, rough. Flowers yellow. Fruit small, green with yellow or greenish-yellow stripes, hard-shelled. Native of Mexico and southwestern United States. (See figures 3, 4, and 5.)

Genus: *Sicana*. Two or three species. Native to tropical America. Monoecious. Foliage glabrous, leaves similar in shape to *C. pepo* but more pointed and usually smaller. (See figures 4 and 5.)

Species: *S. odorifera*. Perennial. Native of Brazil. Angled stems. Branched tendrils. Leaves strongly lobed, cordate at base, margins angled. Flowers solitary, yellowish, staminate 1 inch long, pistillate 2 inches long, with slender ovary. Fruit 1 to 2 feet long, orange-crimson, nearly cylindrical.

Horticultural varieties: Cassabanana or Curuba. Grown for its ornamental fragrant fruit which is sometimes eaten. Of little value here. Has not fruited in the field in three seasons at University Farm.

Genus: *Luffa*. Native to the Old World. Annual. Plant monoecious. Leaves smooth, five-lobed. Branched tendrils. Flowers yellow or pale yellow; pistillate borne singly and staminate in clusters. Fruits green; rind not hard but dry and papery; interior fibrous and may be dried and used as a wash cloth. Seeds black. Requires a long season. Often fruits sparsely in this region. (See figures 3, 4, and 5.)

Species: *L. cylindrica*. Fruit cylindrical or nearly so, 1 to 2 feet long, light furrows, not ribbed. Seeds black, smooth, thin margined.

Horticultural varieties: Rag or Dish Cloth.

Species: *L. acutangula*. Leaves smaller than *L. cylindrica*. Fruits club-shaped, 6 to 12 inches long, strongly ten-ribbed. Seeds black, rough, not margined. In other respects similar to *L. cylindrica*.

Genus: *Benincasa*.

Species: *B. hispida*. White gourd. Wax gourd. Native of tropical Asia. Annual. Hairy, five-lobed or angled leaves. Monoecious. Branched tendrils. Brown, hairy stems. Large, solitary, yellow flowers; staminate on long and pistillate on short peduncles. Fruits round to round-oblong, hairy when young, white waxy covering, shell not durable but fruits will keep for a considerable time. Used for pickling and in curries in Asia. Seeds white. Can be used for an ornamental for a considerable time. Fruits sparsely in this region. (See figures 3, 4, and 5.)

Horticultural varieties: Japanese Mammoth, Wax Gourd, Chinese Preserving Melon, White Gourd.

Genus: *Lagenaria*. Annuals. Native of tropical regions of Old and New World. White, showy flowers borne on long stems and at their best early in the morning. Usually monoecious. Long, forked tendrils. Fruits hard-shelled, usually smooth surfaced, green to whitish-green or tan color when mature, variable in shape, variable in size from a few ounces up to many pounds. Seeds ivory to tan or brown in color, oblong, irregular in shape, thick margins. Soft, pubescent foliage with kidney shaped leaves which are not lobed or only slightly lobed. (See figures 1, 4, and 5.)

Species: *L. siceraria*. (Sometimes designated *L. leucantha* or *L. vulgaris*.) White flowered gourd.

Horticultural varieties: Bottle, Miniature Bottle, Depressed Bottle or Flat Gourd, Dipper, Powder Horn, Pipe, Knob Kerrie, Hercules or Giant Club, New Guinea Butterbean, Kettle, Trough or Sugar Trough, Bird's Nest, Marankas or Dolphin, etc.

Genus: *Citrullus*. Probably native of tropical Africa. Monoecious. Mostly annuals. Vines long, hairy, with branched tendrils. Leaves lobed and relobed. Flowers yellow, small, solitary. (See figures 3, 4, and 5.)

Species: *C. vulgaris*. Annual. Vines hairy. Leaves lobed, relobed, toothed and broad at the apex. Fruits round to oblong, smooth, color white to green or green with light stripes; flesh sweet and varying in color from white to red and yellow. Seeds vary in color from white to black or red.

Horticultural varieties: Northern Sweet, Kleckley Sweet, Winter Queen, and many others. Citron melon is hard, white fleshed, unpalatable in the fresh state but is used in making preserves. Usually not considered as ornamentals, but fruits, especially those of the Citron, keep for a considerable time and some of the smaller types might be used for ornamental purposes.

Genus: *Cucumis*. About 30 species. Native to Africa and India. Mostly annuals, a few perennials. Mostly monoecious, some andromonoecious, a few dioecious. Trailing or climbing vines with simple tendrils. Mostly hairy. Leaves entire or dissected. Flowers small and yellow. (See figures 3, 4, 5, 7, 9, 10, 11, and 13.)

Species: *C. anguria*. (Sometimes designated *C. grossulariaeformis* or *C. erinaceus*.) Vines rough, hairy, angled, with short tendrils. Leaves lobed, rounded sinuses, scabrous. Flowers small, yellow. Fruits small, oval, furrowed, prickly, green turning yellow. Seeds small, white. Fruits used for pickles and make interesting ornamentals for short periods. (See figures 4, 5, and 10.)

Horticultural varieties: West India Gherkin, Burr Cucumber.

Species: *C. dipsaceous*. Native of Arabia. Vine prickly, rough, angled stems. Leaves similar to *C. melo*, nearly reniform, setose, scabrous. Flowers yellow, small. Fruits oblong burrs, densely prickly, small, green becoming straw colored, and lasting a long time. Seeds small, white, flat. Ornamental and an oddity. Fruits sparsely here. Horticultural varieties: Teasel or Hedgehog Gourd.

Species: *C. sativus*. Cultivated cucumber. Probably indigenous to Asia. Fruits vary in shape from nearly round to elongated-ob-

long, spiny in immature stage. Leaves usually three-lobed with acute sinuses. Flowers usually larger than in *C. melo*. Predominantly monoecious. Edible. Not usually considered as an ornamental but properly matured fruits will often keep for a considerable time and are attractive. (See figures 3, 4, and 5.)

Horticultural varieties: Arlington White Spine, Early Fortune, Long Green, Davis Perfect, Straight-8, Boston Pickling, Snow Pickling, National Pickling, Mincu, and many others.

Species: *C. melo*. Indigenous to India. Fruits glabrous or often pubescent, often netted, rarely warty. Leaves nearly reniform, not distinctly lobed, often pubescent. Pollen round. (See figures 4, 5, 9, 11, and 13.)

Subspecies: *C. melo* var. *reticulatus*. Native of Asia. Fruits netted, flesh color green to reddish-orange, sutures shallow, usually ribbed, musky odor. Edible, not ornamental.

Horticultural varieties: Netted muskmelons. Contains most of the Muskmelon varieties grown in this region.

Subspecies: *C. melo* var. *cantalupensis*. Fruits not netted but scaly, rough, warty, hard rind. Grown to some extent in Europe. Edible, not ornamental.

Horticultural varieties: European cantaloupes.

Subspecies: *C. melo* var. *saccharinus*. Oblong, netted fruits. Somewhat similar to *C. reticulatus*. Not grown in this region.

Horticultural varieties: Sucrins, Pineapple melons.

Subspecies: *C. melo* var. *flexuosus*. Fruits long, thick, shallow furrowed, green becoming yellowish, pubescent; white, slightly acid cucumber-like flesh. Seeds white. Flavor not attractive in the fresh state. Sometimes used for preserving. Not particularly ornamental but sometimes grown as a curiosity.

Horticultural varieties: Snake or Serpent melon. (See figure 9.)

Subspecies: *C. melo* var. *inodorus*. Fruits not netted, smooth or ridged skin, often striped; usually white fleshed, little or no musky odor. Late and keep well into the winter. Edible and can be used for a limited time for ornamental purposes.

Horticultural varieties: Honey Dew, Cassaba. (See figure 11.)

Subspecies: *C. melo* var. *acidulus*. Small, inedible fruit. Not grown in this region.

Horticultural variety: Cucumber melon.

Subspecies: *C. melo* var. *chito*. Fruit size and shape of an orange, slightly pubescent, yellow when mature, not fragrant; white, cucumber-like flesh. Seeds white. Used in making preserves and pickles. Does not keep long. (See figure 13.)

Horticultural varieties: Vine Peach, Garden Lemon, Vegetable Orange, Mango Melon, Melon Apple.

Subspecies: *C. melo* var. *dudaim*. Fruits small, round, highly scented, yellow with brown striping or mottling; yellowish flesh. Seeds white. Inedible. Grown for ornamental perfumed fruit. Horticultural varieties: Dudaim melon, Pomegranate melon, Queen Anne Pocket melon.

Subspecies: *C. melo* var. *conomon*. Fruits smooth, glabrous, varied shapes, slightly furrowed, pale green; green or white flesh, not musky. Grown principally as an oddity.

Horticultural variety: Oriental Pickling melon.

Species: *C. metuliferus*. Plant and foliage similar to *C. melo*. Possibly should be classified as a botanical variety or subspecies of *C. melo*. Fruits small, 3 to 5 inches long and 2 to 2½ inches in diameter, green with light spots when young, orange when mature, covered with protuberances surmounted with hard spines, shells fairly hard. A striking novelty that will keep as long as many ornamental gourds. However, it appears to be a short day plant and fruits very sparsely if at all in the field in this region. (See figures 4 and 7.) Horticultural varieties: African Horn, Horned cucumber.

Genus: *Sechium*. Indigenous to tropical America. Slender, glabrous, or slightly hairy, trailing vine. Monoecious. Large, branched tendrils. Small flowers, staminate in clusters and pistillate in the same axils. Fruit fleshy with one large seed.

Species: *S. edule*. Trailing, annual vine. Roots tuberous. Leaves 4 to 6 inches long, angled, shallow lobed, margins entire, broad to triangular ovate. Fruits 3 to 8 inches long, furrowed, wrinkled, green, with a single large flat seed 1 to 2 inches long. Not ornamental. Edible but does not grow in this region. Grown as a vegetable in southeastern United States.

Horticultural varieties: Chayote, Christophine.

Genus: *Trichosanthes*. Forty or more annual species. Native of Asia and Australia. Monoecious or dioecious. Branched tendrils. Entire or lobed leaves. Flowers white, staminate are racemose and pistillate solitary, pronounced hair-like divisions of the corolla lobes. Fruits fleshy, short or long. (See figures 4, 5, and 6.)

Species: *T. anguina* (*T. colubrina*). Annual. Hairy stems. Two- or three-forked tendrils. Flowers deeply fringed, staminate racemose, pistillate single and nearly sessile. Leaves shallowly 3 to 5 lobed, 5 to 9 inches long, nearly glabrous, cordate at base. Fruits 1 to 6 feet long, green with light longitudinal stripes when immature, red when mature, very slender tapering to a point, curved or straight, glabrous, thin skinned, and very tender when mature, flesh red when mature. Seeds ½ inch long, brownish, scalloped on the edges. (See figures 4, 5, and 6.)

Horticultural varieties: Snake or Serpent gourd. Sometimes young fruits are sliced and cooked in the manner of French Beans, but it is grown mostly as an oddity. Fruits sparsely in the field in this region and the fruits do not grow much over 1 foot long. Fruits are thin skinned, soft, and not durable when mature.

Genus: *Momordica*. Annuals and perennials. Native of Africa or Asia. Monoecious or dioecious. Tendrils forked or simple. Leaves smooth, simple or compound. Flowers yellow or white, pistillate solitary, and staminate solitary or paniced, peduncle bears prominent bract. Fruits oblong to spherical, orange, sometimes splitting at maturity into three parts with seeds covered by red pulp sticking in-

securely to inner side, not durable. Seeds gray or brown, scalloped on edges, and patterned. (See figures 3, 4, and 5.) Used chiefly as an ornamental vine.

Species: *M. charantia*. Circular bracts below middle of flower peduncle. Fruits spindle shaped, orange, 4 to 6 inches long, bursting at maturity.

Horticultural varieties: Balsam pear, Large Bitter.

Species: *M. balsamina*. Fruits ovoid, much smaller and usually smoother than those of *M. charantia*. Leaves are usually somewhat smaller and not so deeply lobed. Circular bracts well toward the top of staminate peduncle.

Horticultural varieties: Balsam apple.

Genus: *Echinocystis*. Twenty-five annual and perennial species. Native of North and South America. Monoecious. Branched tendrils. Lobed or angled leaves. Flowers whitish, small, profuse. (See figures 4 and 14.)

Species: *E. lobata*. Annual. Angled, glabrous, slender stems. Leaves 3 to 5 inches long, cordate-ovate, lobed, lobes apiculate, margins entire or slightly serrate. Staminate flowers in long racemes and numerous, pistillate flowers solitary. Fruit 1½ to 2 inches long, dry when mature, weak spines. Seeds ½ inch long, brownish.

Horticultural varieties: Wild cucumber or Hedgehog gourd. Sometimes used as an ornamental vine.

Genus: *Bryonia*. Ten to 12 species. Native mostly of Europe. Perennials. Mostly dioecious. Tendrils simple or forked. Leaves angled or lobed. Flowers small, staminate in racemes, pistillate solitary. Fruit a spherical berry. (See figure 4.)

Species: *B. dioica*. Native of Europe and Asia. Tuberous roots. Simple tendrils. Leaves scabrous, three- to five-lobed, lobes sharply pointed, margins serrate or slightly toothed. Flowers small, greenish-yellow. Fruits ¼ to ½ inch in diameter, red when mature. Small brown seeds. Grown as an annual in this region. Vine ornamental. Fruit not durable.

Horticultural varieties: Red Fruited Bryony, White Bryony.

There are many other genera and species which might be mentioned. Most of these are not adapted to this region. Among the forms that may be met with occasionally are: *Cucurbita palmata*, Coyote Melon; *Cucurbita digitata*; *Cucurbita radicans*, Peten gourd; *Cucurbita okeechobeensis*, Okeechobee gourd; *Coccinia cordifolia*; *Abobra tenuifolia*; *Cyclanthera pedata*; *Melothria scabra*; *Ecballium elaterium*, Squirting cucumber; and *Sicyos angulatus*, One Seeded Burr cucumber.

Chromosome Numbers in Cucurbitaceae

Another characteristic by which some genera and possibly some species of Cucurbitaceae may be distinguished from each other is the chromosome number which ranges from 7 pairs in the cultivated cucumber to 20 and possibly 24 pairs in the Cucurbita genera. A summary of the chromosome numbers that have

Table 1. Chromosome Numbers in Some Cucurbitaceae

| Genus | Common Name | Investigator* | Chromosome Number—1 n† |
|-------------------------------|--------------------------|---------------------|------------------------|
| <i>Cucumis sativus</i> | Cultivated cucumber | 1, 2, 3, 4, 5 | 7 |
| <i>Bryonia</i> | Bryony | 6, 7, 8 | 10 |
| <i>Cucumis anguria</i> | West India Gherkin | 1 | 11 |
| <i>Citrullus vulgaris</i> | Watermelon | 1, 3, 4 | 11 |
| <i>Citrullus colocynthis</i> | Colocynth | 1 | 11 |
| <i>Trichosanthes anguina</i> | Serpent gourd | 2 | 11 |
| <i>Momordica charantia</i> | Balsam pear | 1, 2 | 11 |
| <i>Momordica balsamina</i> | Balsam apple | 1, 2 | 11 |
| <i>Gymnopetalum</i> | | 2 | 11 |
| <i>Lagenaria vulgaris</i> | White Flowered gourd | 1, 2 | 11 |
| <i>Benincasa hispida</i> | Wax gourd | 1, 2 | 12 |
| <i>Cucumis melo</i> | Muskmelon | 1, 3, 4 | 12 |
| <i>Cucumis myriocarpus</i> | | 1 | 12 |
| <i>Coccinia</i> | | 2 | 12 |
| <i>Bryonopsis</i> | | 2 | 12 |
| <i>Melothria</i> | | 1, 2 | 12 |
| <i>Ecballium elaterium</i> | Squirting cucumber | 1, 2 | 12 |
| <i>Sicyos angulatus</i> | One Seeded Burr cucumber | 2 | 12 |
| <i>Luffa</i> | Dish Cloth gourds | 1, 2 | 13 |
| <i>Cyclanthera pedata</i> | | 2 | 16 |
| <i>Echinocystis lobata</i> | Wild cucumber | 2, 9 | 16 |
| <i>Cucurbita maxima</i> | Squash | 1, 3, 4, 10, 11, 12 | 20 |
| <i>Cucurbita moschata</i> | Pumpkin | 1, 4, 10, 11 | 20-24 |
| <i>Cucurbita pepo</i> | Pumpkin | 1, 3, 4, 10, 11 | 20 |
| <i>Cucurbita ficifolia</i> | Malabar gourd | 1, 2 | 20 |
| <i>Cucurbita foetidissima</i> | Missouri gourd | 2 | 20 |
| <i>Cucurbita digitata</i> | | 2 | 20 |
| <i>Cucurbita palmata</i> | Coyote melon | 2 | 20 |

* Investigators: (1) Whitaker, (2) McKay, (3) Passmore, (4) Kozhukhow, (5) Heimlich, (6) Boenicke, (7) Meurman, (8) Strasburger, (9) Kirkwood, (10) Ruttle, (11) Castetter, (12) Rau.

† Number of chromosomes in the haploid or gametic condition.

been determined for a number of genera are given in the table above. Many of these counts are well established while a number of them require further investigation.



Bibliography

While a considerable amount of information on the cultivated Cucurbitaceae and particularly on the ornamental kinds has been given in this publication, the whole story has not been told by any means. For the information of those who desire to pursue the knowledge of this interesting family to a greater extent, a list of some of the literature follows:

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International Gourd Society, 3276 W. Olympic Blvd., Los Angeles, California.

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