

## **New Color Introductions in Spoon and Egg Gourds**

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### **History and types of gourds**

Gourds are defined as “hard-rinded” fruits within the family Cucurbitaceae (common name cucurbits) that are often used for ornamental purposes, vessels and even musical instruments. The most common gourds fall within two different taxonomic classes: the bottle gourds (*Lagenaria siceraria*) and a variety of gourd types in *Cucurbita pepo*. The species *Cucurbita pepo* includes other familiar cultigens such as acorn and delicata squash, summer squash, and jack-o’-lantern pumpkins.

Bottle gourds have an ancient agricultural history. The wild progenitor species are native to East Africa, however, archaeological evidence has revealed that bottle gourds had worldwide distribution and were used by different human cultures several thousand years ago. How did they get distributed to SE Asia and the Americas as early as 9000 years ago? It was found that if gourds were floated on seawater for several months, the seed could still survive. It was therefore hypothesized that gourds may have been carried far and wide by the ocean currents.

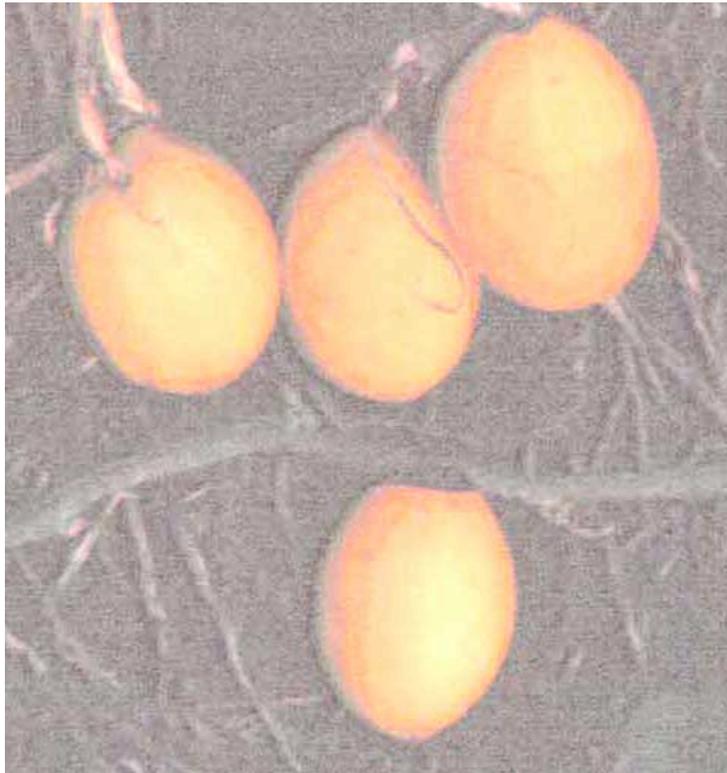
On the other hand, *C. pepo* gourds are native to the southwestern United States and parts of Mexico. Variation in shapes, sizes and colors apparently came about through human selection as the gourds were utilized and propagated by native American cultures during the past three thousand years or more. In pre-Columbian times, *pepo* ranged from the southern border of eastern Canada, south through the East coast of the United States, throughout the Middle West, and into the southwestern United States and Mexico.

### **Gourd breeding objectives at UNH**

The *C. pepo* gourds are represented by an incredible diversity of types in terms of color, patterns of colors, shapes and sizes. Most seed companies offer ‘gourd mixes’ that include a reasonable multitude of small to medium size gourds of various shapes and sizes. These mixes can be highly variable from one year to the next as to what proportion of the different gourd types are produced.

My interest in gourd breeding came about in the mid-1990s as I pondered what sort of gourd breeding work might be successful in introducing some newer, more reliable types of gourds that would provide growers with some additional crops that could be profitably marketed in the fall season. My own experience in growing gourds in New Hampshire suggested that gourd maturity often occurred late into the fall market window, and that the long vines of traditional gourds were not well suited to the best cultural practices, such as plastic mulching and drip irrigation. In addition, the color and pattern variability in some of the smaller gourds such

as spoon, pear and especially egg gourd (Figure 1), were limited. In fact, the only color I found in the attractive egg gourd was white.



**Figure 1. Egg gourds about 2 inches long.**

Given the above facts, my objectives were to create some new varieties of spoon, pear and egg gourd with 10 days to two weeks earlier maturity than the current varieties, with a more compact growth habit and a greater variety of colors and color patterns.

### **Colors and patterns in egg gourd**

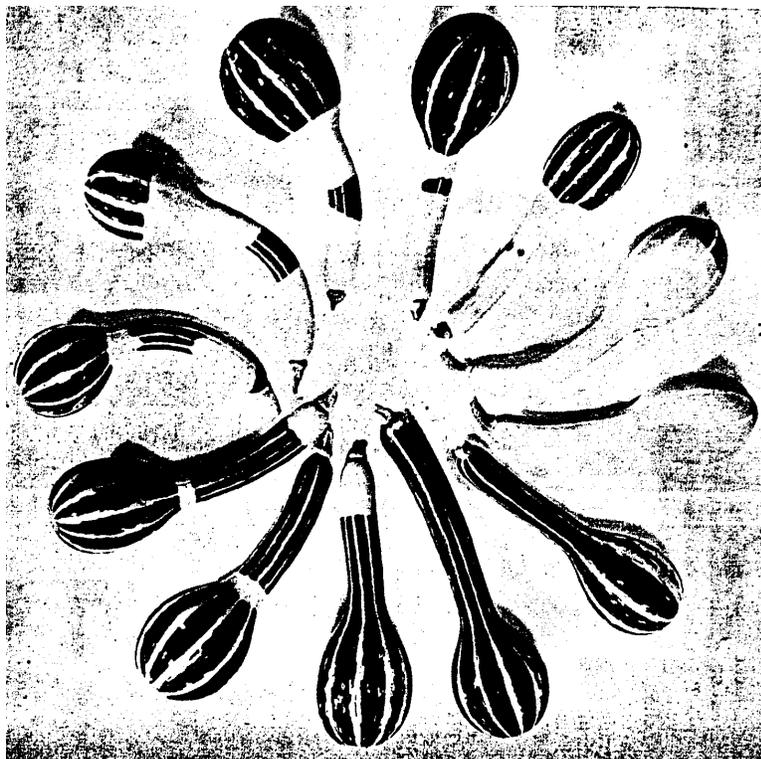
Transferring the bush gene and genes for earlier maturity to gourds was accomplished by crossing the egg gourd to a small-fruited bush strain of pumpkin. The task was not easy. Even a pumpkin the size of a baseball is genetically very distant from an egg gourd in terms of size, color genes, and genes for maturity. Most of the color and pattern genes for developing new egg gourds were donated from spoon gourds. A surprising array of colors and patterns can be produced from just four genes: white versus light yellow at maturity; striped versus non-striped, precocious orange versus green fruit; and dark green versus light green. There are also genes that affect the pattern of precocious orange versus green rind coloration, but the genetics of these genes is still unclear.

Currently, I have uniform lines that have solid white fruit, solid orange fruit, solid yellow fruit, solid green fruit, green/white striped fruit, green/yellow striped fruit; green/orange striped

fruit, and bicolor orange and green fruit with stripes. Many of these breeding lines are extremely productive with individual compact plants able to produce 40 to 60 gourds. Several breeding lines of egg gourd are now being produced by a seed company, so that an egg gourd mix can be released to growers in the near future.

### **Variation in colors, pattern and shapes of spoon gourd**

Breeding early, compact strains of spoon gourd (Figure 2) has proven to be somewhat more formidable than development of egg gourds. Part of the problem is that there is a lot more variability in shape and size of spoon gourd, so there are just more genes with which a breeder has to deal. All the different shapes and sizes look attractive, but only so many can be propagated and released. Everyone has a slightly different opinion on which shape, which size and which color is most attractive. In some ways, this is not such a bad problem because anything new and improved could benefit growers and consumers. In addition to the color and patterns displayed by egg gourds, spoon gourds display more complicated color banding patterns (Figure 2). In some instances, fruit from a single plant may vary from solid green color at maturity to fruit having two bands (orange and green), three bands, four bands and sometimes even five bands.



**Figure 2. Striped spoon gourds showing different bicolor (green/yellow or orange) banding patterns.**

I now have two genetically uniform lines with multiple banding patterns, one line has yellow and green bands and the other lines has orange and green bands. Both of these strains

have a spreading bush habit of growth, and they have relatively early maturity. Seeds of these two strains are being increased by a seed company, and hopefully, these new unnamed varieties will be available to growers in 2005.

### **Summary**

Breeding work was initiated in 1996 to develop earlier, more productive and more colorful strains of spoon and egg gourds. Breeding progress has been exceptionally rapid, and the New Hampshire Agricultural Experiment Station now has several strains of egg and spoon gourd that are being produced by a seed company for release to the commercial market. It is hoped that some of these new varieties can translate into increased profit for vegetable growers and an attractive ornamental crop for consumers to purchase.