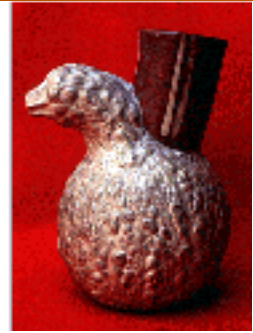




Ethnobotanical Leaflets



Daucus carota - Origins and New Directions

By Jeff Myers

Daucus carota (carrots) are one of the more commonly used vegetables in the western world. A member of the parsley family (Umbelliferae) which includes caraway, celery, dill, and parsnips, the history of the carrot is somewhat obscure. The potential for enhancing the nutritional value and consumption of carrots, however, may be very promising. Carrots are high in beta-carotene, an anti-oxidant carotenoid that is the carotenoid compound most readily converted to vitamin A when consumed by animals.

Carrots likely originated in the near east and central Asia, from Afghanistan to northwest India, where they were probably cultivated for at least 3,000 years. Carrots may have originally become domesticated through the discarding of the propagating structures after the vegetative structures were consumed. The potential of the remains to continue growth is high. Therefore, it is possible that the disposal of these vegetable tops in garbage heaps may have allowed for colonization of the area and subsequent domestication (Rindos, 1984). Very early evidence of the consumption of carrots also has been found in prehistoric Swiss lake dwellings (Brothwell and Brothwell, 1969).

The original wild-type carrots were thin, wiry, and varied in color from white to purple, but not the common orange that we see today. Wild-type carrots are also known as Queen Anne's Lace. The origin of the name is based upon an English legend. Supposedly, when the future Queen Anne arrived from Denmark to become the queen of King James I of England, wild carrot was still a novelty in the royal gardens. The legend states that Queen Anne challenged the ladies of the court to a contest to see who could produce a pattern of lace as lovely as the flower of the carrot. The ladies knew that no one could rival the queen's handiwork so it became a triumph for Anne (Haughton, 1978). Other common names for wild carrot are bird's-nest and devil's-plague.

Mutations led to changes in the pigmentation. Both the purple and yellow-orange varieties migrated to the Mediterranean where they responded well to cultivation and selection (Brothwell and Brothwell, 1969). Carrots were recognized as one of the plants in the garden of the Egyptian king Merodach-Baladan in the eighth century B.C. The carrot's use was believed to be limited during this time and throughout the rise of the Greek and Roman civilizations (Brothwell and Brothwell, 1969). Both the

Greeks and the Romans were believed to have used carrots for medicinal purposes (Herfruit S.L., 1999). Wrote Dioscorides, "Ye root ye thickness of a finger, a span long, sweet-smelling, edible being sodden [boiled]. Of this ye seed being drank...and it is good for ye [painful discharge of urine] in potions, and for ye bitings and strokes of venomous beasts; they say also, that they which take it before hand shall take no wrong of wilde beasts. It cooperates also to conception, and it also being [diuretic], both provoketh [poison], and being applied; but the leaves being beaten small with honey, and laid on, doth cleanse rapidly spreading destructive ulceration of soft tissues." (Mitch, 1998).

The carrot probably became more popular as a food in Europe in the middle ages. The first written reference to carrots dates back to writings from 12th century in Spain, which report carrot consumption with oils, vinegar, and salts (Herfruit S.L., 1999). The vegetable became common in European diets by the 14th century. It was also being used as a dye for butter and the leaves were used for hat decorations (Herfruit S.L., 1999). Shortly thereafter, carrots were taken to China which is now the worlds leading producer of the crop. Beginning in the early 17th century, Dutch agriculturalists began to develop new varieties of carrots, preferring the orange and breeding out purple varieties. Shortly thereafter the carrot was taken to North and South America and Japan.

With the advent of vitamin science in the 19th century, interest in the nutritional value of carrots increased (Haughton, 1978). The British developed high-carotene carrots during World War II in order to enhance the night vision of their pilots (via massive consumption). Recently, researchers have been attempting to develop varieties that maximize beta carotene content. Dr. Leonard Pike of Texas A & M University has developed through breeding a variety of carrot that contains approximately double the beta-carotene content of the common carrot. Interestingly, this carrot is also a maroon-purple color, a throw-back to a characteristic bred out of common carrots long ago. According to a Texas A & M press release, this characteristic was obtained via Brazilian seeds. A few plants grew with this now unusual color and Dr. Pike originally looked at them as a potential novelty crop for Texas A & M University since the school color is maroon. However, Dr. Pike analyzed the carrots and found extremely high beta-carotene levels. He quickly changed his focus from growing novelties to a breeding effort to enhance beta-carotene content. The gene (or genes) responsible for the maroon color segregate with the gene (or genes) responsible for beta-carotene content. Thousands of carrots were subsequently analyzed, selected, crossed, and re-analyzed until breeding lines were established. Dr. Pike eventually hopes to improve the vitamin A levels in the diet. According to John Key of Monsanto Corporation, there is a great deal of resistance to the variety due to the unusual appearance. Dr. Pike is conducting additional studies on a molecular level to attempt to further isolate the beta-carotene gene in hopes of developing additional improved carrot varieties or possibly transforming other plants.

Other recently suggested novel uses of the carrot include as an oral contraceptive for females. Reportedly, if the seeds of the wild-type plant are chewed, the chemical compounds greatly inhibit conception. A study by a researcher at the University of Quebec indicated a possibility that the oils contained in the seeds prevent implantation of the fertilized egg in the uterine wall. A considerable amount of follow up studies would likely be needed before a treatment such as this became acceptable.

Although not particularly well-known or well-documented, carrots have an interesting past and have

played a role of increasing significance as a vegetable crop. Additional historical studies might help to clarify this role. The importance of the anti-oxidant beta-carotene and its other healthful benefits should cause carrots to remain a key part of the diet. Scientific research is expected to continue to enhance the benefits of carrots as a crop.

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