Management of N fertilizer of carrots grown for fresh market and canning in the Rio Grande Valley of Texas is difficult because of double cropping with other vegetables and field crops. High soil mineralization rates in the area (3, 4, 6) result in N accumulations that can have a major influence on the fertilizer requirements of field and vegetable crops. Available markets influence the length of growing season for vegetable crops; if markets are poor some crops such as carrots and beets can remain in the field unharvested or they can be harvested at an early date if the market price is worth the sacrifice of yields. Some information is available regarding fertilizer rates for carrots under South Texas conditions (1, 5) but data that relates length of growing season to N requirements are lacking. Plant analysis could be helpful in determining N requirements for various growth periods if sufficient levels of N were established but little data are readily available for nutrient level requirements in carrots (2). These studies were conducted at the Texas Agricultural Experiment Station at Weslaco to gain information concerning the fertilizer N requirements of carrots and foliar levels of N required for max yields.

Soil at the experimental site was a sandy loam and contained 65 kg NO3-N/ha in the 0 to 120 cm profile prior to application of N treatments. Cotton had been harvested from the plot area 42 days before carrot planting. N treatments were applied preplant broadcast at 0, 56, 112 or 168 kg/ha and mixed into the soil surface with a rolling cultivator and rotovator. 'Long Imperator 58' carrots were planted in double rows on 102 cm beds and irrigated to obtain a stand. Cultural practices were those common to the area except for fertilizer application. Plant samples were collected by cutting 20 plants per plot at soil level, rinsing in distilled water and drying at 70°C. The dried plant tops were ground in a Wiley mill and analyzed for total N content.

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The N concn in carrot tops sampled 96 days after emergence increased yields not related to yield between 3.4% and 4.1% N. For a 128 day growth period, carrots containing 3.7% N produced 11 MT/ha and carrots with 4% N produced 12.5 MT/ha. Higher N concn did not produce higher yields. After 143 and 161 day growth periods, carrots required 4.0% N in tops for max yields in this study. The N concn in carrot tops sampled 96 days after emergence increased yields not related to yield between 3.4% and 4.1% N. For a 128 day growth period, carrots containing 3.7% N produced 11 MT/ha and carrots with 4% N produced 12.5 MT/ha. Higher N concn did not produce higher yields. After 143 and 161 day growth periods, carrots required 4.0% N in tops for max yields in this study.

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**Response by Carrots to Nitrogen and Assessment of Nitrogen Status by Plant Analysis**

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Additional index words. *Daucus carota*, fertilizer, tissue testing, plant nutrition

**Abstract.** Under subtropical conditions yield response of carrots (*Daucus carota* L.) was obtained from N applications to 112 kg/ha with growth periods greater than 128 days. The adequate level of N in carrot tops was 2.8% and 4.0% dry weight when sampled 96 and 49 days after emergence, respectively.

When carrots were harvested 112 days after emergence, yields were less than 3 MT/ha and were not influenced by N application (Fig. 1). After 128 days, higher yields were produced and a yield response to 56 kg N/ha occurred. Carrots harvested after 143 or 161 days produced about 25 MT/ha when fertilized with 56 kg N/ha. Yields were 29 and 30.5 MT/ha with 112 kg N/ha application when harvested 143 and 161 days after emergence, respectively. Application of 168 kg N/ha did not increase yields over the 112 kg/ha rate at any of the harvest dates.

The N concn in carrot tops sampled 49 days after emergence at each fertilizer level were related to carrot yields (Fig. 2). Yields after 112 days of growth were so low that N concn in tops was lacking in the *rin* tomato. Buescher and Tigchelaar (2) reported that polygalacturonase is involved in the process of softening of normal fruits and its absence is associated with lack of softening in *rin* tomatoes. Perhaps in fruits, exogenous ethylene only induces or activates one or several enzymes in the first mechanism but none in the second.

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Inheritance of Flower Bud Abortion in Cucumber

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Abstract. Flower bud abortion, which can influence crop maturity, has been observed in gynoecious and/or predominantly pistillate strains of cucumber (Cucumis sativus L.). Pre-anthesis abortion was completely dominant to non-abortive. The flower bud abortive trait tentatively assigned the symbol Fba was shown to be linked with femaleness with an average map distance of 18 crossover units.

A diversity of true-breeding sex types exists in cucumber. Common cucumber cultivars are monoecious (i.e., separate staminate and pistillate flowers on the same plant) and have a flowering pattern typical for each cultivar under given environmental conditions (7). Monoecious cultivars have an initial period of entirely staminate flower production (staminate phase) followed by a period of mixed pistillate and staminate flowers (monoecious phase) and ultimately a period of pure pistillate flowers (gynoecious phase). “Femaleness” is a characteristic of most recent cucumber cultivars. The inheritance of sex type has been extensively investigated (1, 2, 3, 6). It has been established that monoecious and gynoecious strains differ by one major pair of alleles. Monoecious strains are homozygous Acr Acr while a pure gynoecious strain is homozygous Acr Acr (6). The dominance relationship between the 2 alleles is not straightforward, since it is often conditioned by environmental factors as well as by modifying genes (7) and multiple alleles (3). Data reported by Shifriss et al. (8) suggested that flower inhibition or abortion may be associated with the expression of the Acr genotype.

Theoretically, gynoecious or predominantly pistillate cultivars should be earlier in maturity than monoecious cultivars, because pistillate flowers bearing the immature ovaries occur at lower nodes on the main stem. However, a gynoecious strain has been shown to be later in fruit maturity than a monoecious strain (5). The difference in maturity was due primarily to flower bud abortion observed at the lower nodes on the main stem of the gynoecious strain and not to later flower initiation. The present study was conducted to determine the genetic basis for flower bud abortion and to evaluate a possible linkage relationship between this character and the gynoecious genotype.

The parental strains used in this study were MSU 713-5 (P1) and MSU 0612 (P2). MSU 713-5 is a gynoecious strain which initiates pistillate flowers on the lower nodes of the main stem. Most of these early flowers abort prior to anthesis, and therefore do not contribute to crop yield (5). MSU 0612 is a monoecious strain which initiates staminate flowers through nodes 15-20 on the main stem. Flower bud abortion prior to anthesis has not been observed on this strain.

Crosses between the 2 parental strains were used to generate F1, F2, BC1 (P1 x F1) and BC2 (P2 x F1) populations. Each population was hand planted in the field at Lubbock, Texas, on June 4, 1974. Plants were spaced 30 cm apart on 100 cm rows. A completely randomized block design was used. The plot was irrigated immediately following planting and herbicides were not applied. The photoperiod was 14 hr with a mean temp of 26°C (34° average maximum – 19° average minimum).

Two traits were recorded daily for each flower, through the first 10 nodes on all plants. These were 1) whether the flower was pistillate or staminate and 2) whether or not the floral bud abortion prior to anthesis. Female tendency was estimated as the ratio of pistillate flowers to total flowers.

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