Alternaria leaf spot: This leaf disease is caused by a fungus. It is more severe when humidity is high, as during the period of summer rains in Arizona. Lesions of this leaf spot begin as brown spots. Affected areas enlarge and may then cause the leaf to drop.

Texas Root Rot: Guar is highly resistant to Texas root rot, Phymatotrichum omnivorum. While the fungus causing Texas root rot disease may attack guar, damage is usually not of economic importance.

Other Diseases: Several viruses attack guar but losses have not been serious in Arizona. One disease called top necrosis virus has resulted in significant losses in the Lower Rio Grande Valley of Texas. This virus causes terminals to turn brown and then die. Guar is susceptible to the following root rot diseases: Sclerotium rot, Sclerotium rolfsii; Fusarium root rot, Fusarium sp.; and Black root rot, Rhizoctonia solani. Guar does appear to inhibit certain root rots of wheat and cotton and therefore may benefit these crops when they follow it in the rotation.

Harvesting Guar. Harvest of guar is usually by direct combining. Plants are ready for harvest when seed pods are brown and dry and when moisture content does not exceed 14%.

In Arizona, where green weed growth is not a problem, harvesting has usually been delayed until plants mature and defoliate naturally or until after frost. When necessary, paraquat may be used as a desiccant. Be sure to follow label recommendations when paraquat is applied. When combining guar, remove alternate reel slots to reduce stripping and shattering. Some combine operators report good results when reel slots are replaced with 1" steel rods or conduit. The reel should be set so as to run 6"-12" ahead of the cutter bar and reel speed should be slightly faster than ground speed. When reel speed is too slow or too fast, shattering may be increased.

Cylinder speeds must be slow to minimize seed damage. Concave clearance should start at 3/4" and the cleaning shoe should have full air. A high fan speed may be used to remove foreign material since guar seeds are quite dense. Shattering caused by breaking of pods has been a serious problem in Arizona.

The Physiology of Wild Gourd

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Summary

Experiments have been conducted to determine some of the physiological characteristics of the Buffalo gourd (C. foetidissima). Seedling respiration rates of two open pollinated varieties and two hybrids were determined. These rates were later correlated with photosynthetic and photorespiration rates of the same varieties under controlled environmental conditions.

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The buffalo gourd (Cucurbita foetidissima) is a wild xerophytic plant that grows mainly in the southwestern U.S. In recent years, efforts have been made to domesticate the buffalo gourd because of its high potential as a food and fuel crop grown in arid regions. A multidisciplinary team headed by Doctors W. P. Bemis, J. W. Berry, and C. W. Weber studied the agronomic characteristics and possible utilization of the plant. The buffalo gourd has many desirable qualities including a large tuberous root containing high starch levels, and seed yielding high quality vegetable oil and protein.

Recent studies have tested the physiological characteristics of the plant. An initial experiment was conducted to ascertain which temperature would be most beneficial for seedling growth (Figure 1a). The respiration rate reached its highest value under a 30°C regime. Under all these regimes, the values began to taper off by the 8th day due to lack of cotyledonary reserves.

After the optimum temperature was established, four lines, of which two are hybrids [250 x 300 and (140 x 156) x 300] and two are open pollinated varieties (synthetic and 300) were tested to determine the respiration rates under a uniform temperature regime (Fibure 1b). The two open pollinated lines had the highest respiration rates while the two hybrids had the lowest. Also, there was a 50% difference in respiration rates between 300 and [(140 x 156) x 300]. A third experiment was performed utilizing young plants grown from the four seed sources. These plants were surveyed monthly under controlled environmental conditions to determine their photosynthetic rates. It was noticed that the lines with the lowest respiration rates as seedlings, had the highest photosynthetic rates (Figure 2).

Many species of plants which exhibit low respiration levels and high photosynthetic rates generally have higher quantities of carbohydrate reserve. This reserve energy may result in more abundant plant growth and/or higher yields of various plant products. Future studies will determine whether this pattern holds true for wild gourd under field conditions.

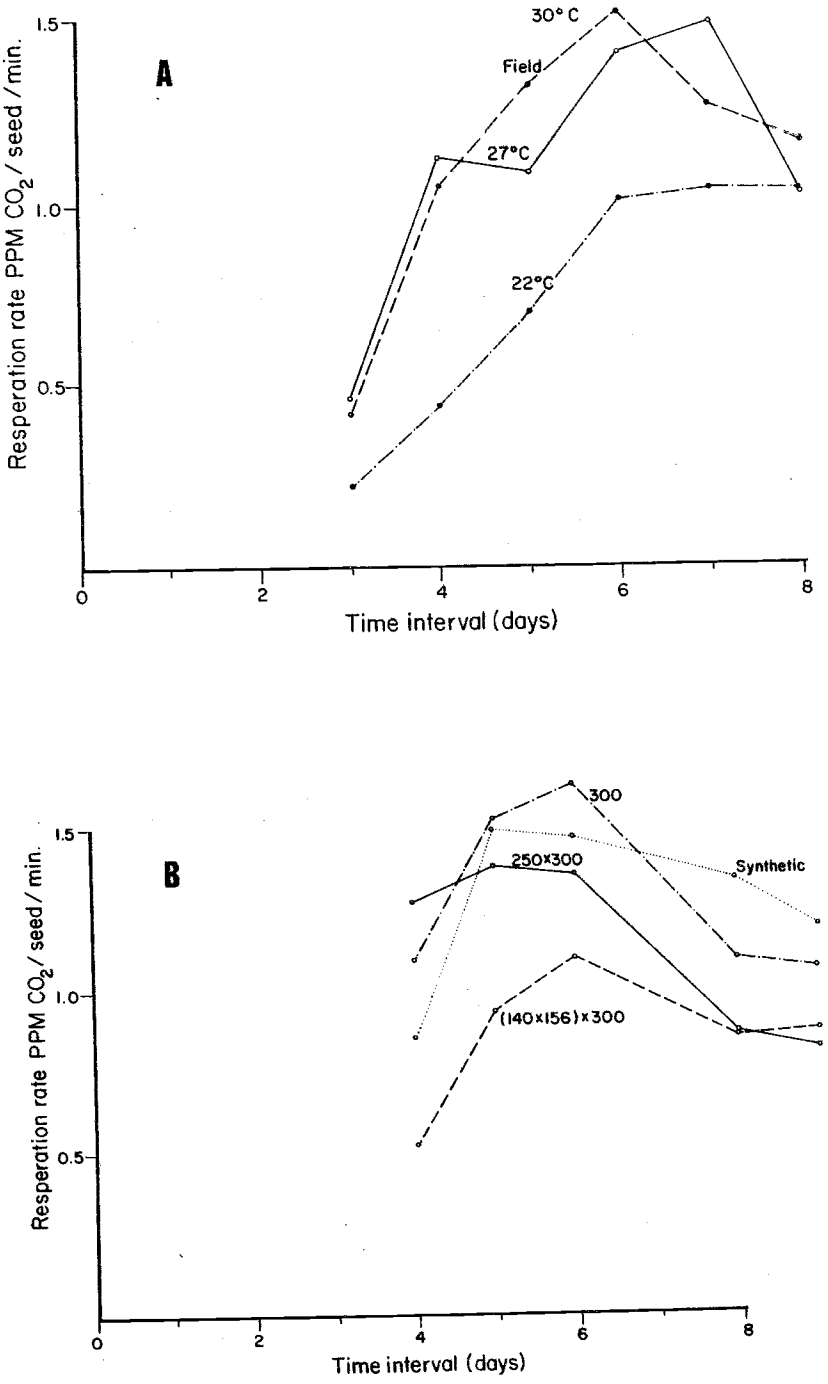

Figure 1. The effect of temperature change on the respiration rate of variety 300 seedlings at different time intervals following germination (a), and the seedling respiration rate of 4 wild gourd varieties at two day intervals at 30°C (b).

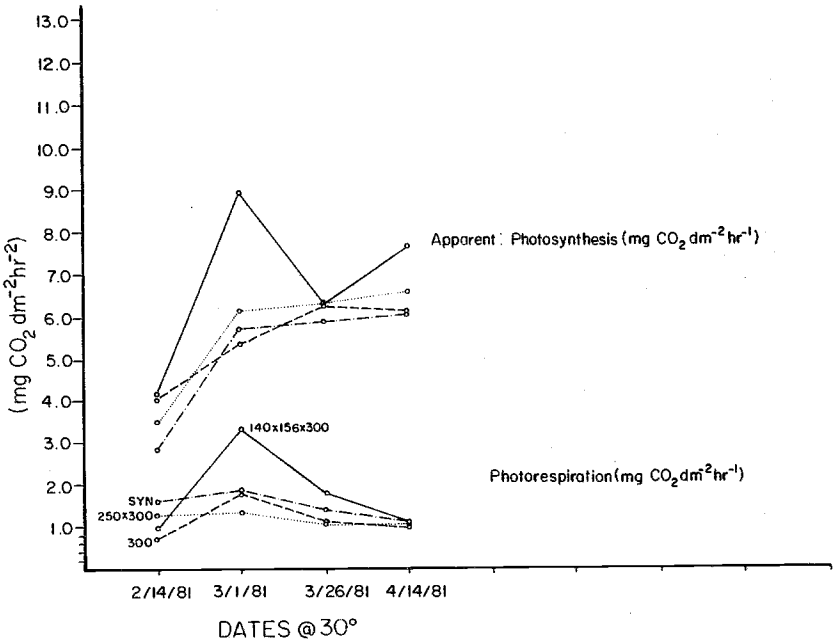

Figure 2. The change in apparent photosynthesis and photorespiration over time using four wild gourd varieties.

CASSAVA: A POTENTIAL FORAGE AND STARCH CROP FOR ARIZONA

by:
J. O. Anderson, C. W. Lee and D. L. Johnson

SUMMARY

Cassava, normally considered a tropical crop, shows considerable potential as a low "input" forage and food crop for the Southwest. Cassava has been successfully cultivated in the Tucson area with respectible yields. The primary limitation to the cultivation of Cassava appears to be a lack of cold tolerance. However, cold tolerance may be found in wild relatives of Cassava which are native to Arizona.

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Cassava is grown world-wide as a food and forage crop, present in the diets of approximately 400 million people. Thus, Cassava is second only to the sweet potato as a major food crop.

Cassava's probable center of origin is thought to be Brazil. Thus Cassava is normally considered a tropical crop ill-adapted to the climate of the United States. However, wild relatives of Cassava are native to Arizona, capable of growing at extreme temperatures under natural rainfall conditions. In addition, Cassava exhibits some drought tolerance and has the ability to grown and yield well on a wide range of soil types with low fertility.

Preliminary attempts to grow commercial strains (developed in South America) of Cassava in Arizona, have been successful on a small scale (see Table I).