

IV OTHER VEGETABLES

Irrigation Trials with Cabbage (W. D. Pew and J. H. Park)

Abstract: The influences of soil moisture are pronounced in cabbage grown under Arizona's semiarid conditions. An understanding of these effects is a must if the most effective cabbage production is to be achieved. High, constant levels of moisture reduces solidity, increases apparent size, reduces color and general market acceptance. On the other hand, dry soil moisture conditions increases solidity and color and reduces size and generally impairs market quality because of the smallness of size and the tough and woody texture of the cabbage thus produced. Best quality cabbage commensurate with acceptable yields and greatest effectiveness is obtained where moisture is kept at 75-80 centibars of tension.

Introduction

Considerable interest has been generated in the past concerning the proper use of irrigation water in the commercial production of cabbage. Most growers have developed and used water programs that provide a relatively high level of moisture. However, these programs may not accomplish the production results desired.

Methods

Five treatments, four of which varied from a constant very wet (18-20 centibars of tension) schedule to a dry (75-80 centibars of tension) regime and one two-stage level combining two of the aforementioned levels applied at two stages of plant development. Plots were planted in the usual commercial manner with a three-bed vegetable planting sled. Seeds were planted approximately $3/8$ inch deep in a dry seedbed and at the rate of two pounds per acre. Treatment plots were 6.67' x 50'. Harvested area for record purposes was the two center plant rows of each plot and each of these was 50' long. Harvesting was done by hand cutting when the heads were mature enough to have reached commercial readiness. Data recorded included both total weight and number of heads per plot. Moisture measuring devices were placed in a center row in two of the replications near the center of the test area. The instruments were placed 10 inches deep and when the average reading was reached, indicating the proper soil moisture levels, an application of water was made. The water was allowed to run until the readings were reduced to 0. Rainfall during the test period was: 7 October - .71", 11 November - .28", and 19 November - .28" for a total of 1.27".

Results and Discussion

The data assembled from these tests show that the higher moisture levels not only reduced yields as noted in Table 1, but were more expensive because of the greater water and labor requirements.

Table 1.

Treatment	Yield in 50 lb. Bags/Acre			Total	No. of Irrig.
	1st Cut	2nd Cut	3rd Cut		
1. Very Wet 18-20 centibars tension	283	197	268	748	13
2. Wet 35-40 centibars tension	336	184	244	762	5
3. Medium Wet 55-60 centibars tension	391	166	233	790	4
4. Dry 75-80 centibars tension	254	355	229	838	1
5. Stage 1 - same as No. 4 until heading stage					
Stage 2 - same as No. 2 through harvest	333	167	224	724	4

An evaluation of the data by cuttings indicate that the highest early yield was received from treatment No. 3 with the poorest from treatment No. 4. In the second cutting the reverse was true for these two treatments and the yields in the third cutting were not significantly different. The reasons for this reversal in the early cuttings between these two treatments is not entirely clear. It would appear that there is a moisture level threshold associated with head development and maturing procedure of this crop. It also appears that cabbage plants produce better under lower soil moisture conditions than now followed. However, the dry treatment in this test was too severe for maximum early yield and should be avoided, yet, the next higher level (medium wet) produced its heaviest yield in the first cutting. The use of a two-stage irrigation program; one for early growth and another for late growth, is not advantageous.

Measurements and observations made concerning the condition and quality of the cabbage indicate that the heads from treatment 3 were most ideal of any group in size, solidity, shape, and general market condition. Increasing the level of water decreases the solidity of the heads, reduced color, increases apparent size, and reduces market desirability. Heads from the dry treatment were smallest, most solid, deepest green, but had a tendency to be tough and woody.

In summary it would appear that excessive watering or constant high levels of soil moisture not only reduces yield, but reduces solidity by increased sponginess and reduces color, whereas, the cabbage grown under dry conditions was small in size and generally became very hard and tended to be tough and woody. Heads from this treatment did, however, carry the best color. Plants grown under relatively dry (75-80 centibars tension) condition produced the best cabbage and was highest in yield.