This area should be about twice the size of the fan outlet area, but in no case more than enough to reduce the \( \frac{1}{4} \) inch of static pressure required to hold the plastic cover in place. Further, fan capacity should be increased and/or the pile size decreased so that we can anticipate an air exchange of from 1 to 5 CFM per ton of grain at \( \frac{1}{4} \) inch static vacuum or more. This specification requires that we match the fan capacity at a given static resistance to the resistance of air flow through the grain. The static resistance in sorghum will vary from about \( \frac{1}{2} \)" static resistance at 10' grain depth and 5 CFM per ton to as much as 7" static resistance at 100' grain depth and only 1 CFM air flow per ton. As air flow required increases and the grain depth increases, the static resistance to air flow increases rapidly. Even at the lowest beneficial air flow for aeration through 10' of sorghum we quickly exceed the static characteristic of an evap-cooling fan which usually does not exceed 0.4 inches of water. Thus, fans with higher static vacuum capacity are required as outlined in USDA Marketing Research Report 178 "Aeration of Grain." On the other hand, some air may flow at \( \frac{1}{4} \)" static pressure. The question is, how much? It is doubtful that the air flow amount will approach minimum aeration level. It is doubtful that the air flow amount will approach minimum aeration level. Hence, we can assume that an aeration design for high moisture content grain storage will require a fan capable of developing 7" of water static suction. This rules out the use of evap-cooler fans.

Grain harvested from the field during the day is usually quite warm. One of the advantages of aeration is that the cool night air can be drawn through the pile to cool this grain down to a temperature more near the average for the season. It's an easy matter to flip the plastic back in place over the inlet duct for daytime operation. Plastic films exposed to the sun will show continuous deterioration because the ultraviolet fraction of the sun's rays cause a chemical reaction. Six mil polyethylene will stand at least one year's exposure. With care, the top cover can be salvaged for use again next season. It is suggested that the top cover be used on the bottom for the second season. It may be possible to salvage the bottom sheet but it is generally assumed that this will be severely damaged when loading out the grain. If odd sizes are required because of some mistake in pile dimension, (i.e. a 40' film does not cover the top of a pile) plastic film handlers have a film solvent cement that will glue sheets together.

The total out of pocket investment cost for storing 130 tons of sorghum on the Combs farm was $82.00. The cost of continuous operation of the 1/3 horsepower electric motor is about 12 cents per day.

If an aeration system is required, it is suggested that you call the Extension Agricultural Engineer at the University for design assistance.

BLOOM SPRAYS OF GIBBERELLIN ON GRAPES

PROGRESS REPORT

By J. M. Nelson, G. C. Sharples, J. R. Kuykendall,
L. F. True and H. F. Tate

In recent years the table grape market has placed a premium on grape clusters with large berries. Growers of Thompson Seedless grapes have been able to produce a large berry size through the use of post-bloom applications of gibberellin and by girdling. Gibberellin (GA) is a growth regulator which causes development of greatly enlarged berries when applied to grape clusters following bloom.

As berry size is increased, however, clusters become very compact making packaging more difficult and providing a more favorable environment for bunch rot. Berry thinning is an effective method for loosening tight clusters but requires expensive hand labor. Results of experiments in California vineyards suggest that spraying the flower clusters with GA during bloom reduces berry set and consequently prevents tight clusters from developing. If true, fruit set could be reduced by bloom sprays of GA, and the need for hand thinning of (Continued on Next Page)
Summary of Results Obtained With Gibberellin Sprays on Thompson Seedless Table Grapes in 1967

<table>
<thead>
<tr>
<th>Gibberellin Treatments</th>
<th>% Berry Set</th>
<th>Berries/ (cm) Lateral</th>
<th>Length (cm)</th>
<th>Berry Wt. (gm)</th>
<th>% Soluble Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>46</td>
<td>3.7</td>
<td>16.8</td>
<td>2.21</td>
<td>16.9</td>
</tr>
<tr>
<td>Pre-bloom Only</td>
<td>37</td>
<td>3.2</td>
<td>16.8</td>
<td>2.10</td>
<td>16.6</td>
</tr>
<tr>
<td>Bloom Only</td>
<td>49</td>
<td>3.8</td>
<td>18.7</td>
<td>2.50</td>
<td>17.2</td>
</tr>
<tr>
<td>Bloom Plus Single Post-Bloom</td>
<td>50</td>
<td>3.9</td>
<td>19.3</td>
<td>3.33</td>
<td>15.5</td>
</tr>
<tr>
<td>Bloom Plus Split Post-bloom</td>
<td>55</td>
<td>3.5</td>
<td>19.3</td>
<td>4.04</td>
<td>14.6</td>
</tr>
<tr>
<td>Single Post-bloom Only</td>
<td>43</td>
<td>3.4</td>
<td>17.1</td>
<td>3.49</td>
<td>15.2</td>
</tr>
<tr>
<td>Split Post-bloom</td>
<td>48</td>
<td>3.4</td>
<td>18.8</td>
<td>3.81</td>
<td>14.8</td>
</tr>
</tbody>
</table>

Least significant difference at 5% Level 8 N.S. N.S. 0.50 1.2

(Continued from Previous Page)

berries eliminated.

Experiments were conducted in a commercial vineyard near Litchfield Park, Arizona in 1966 and 1967 to evaluate the effect of bloom sprays of GA on Thompson Seedless grapes under Arizona conditions.

In 1966, sprays of 20 ppm GA were applied when 50 percent of flowers were open and when 90 percent were open. The standard post-bloom spray of 30 ppm was applied at shatter to both untreated and treated vines. Following bloom, clusters were thinned to about six lateral stems (shoulders) by removing the tip portion and vines were girdled. The final crop consisted of about 20 to 24 clusters per vine. There were three replications of three-vine treatments.

At harvest each cluster was subjectively rated for looseness by five independent observers. To obtain a more direct measure of fruit set the number of berries per centimeter of lateral stem length for the uppermost lateral on 15 clusters per treatment and the number of berries per cluster was determined.

The ratings showed no relation be-

tween bloom sprays and cluster looseness. Rating the clusters was difficult, however, due to differences in berry size. Clusters sprayed at bloom produced significantly heavier berries than clusters receiving only shatter sprays. This indicated the bloom sprays were additionally effective in increasing berry size.

Comparison of number of berries per centimeter of lateral and number of berries per cluster did not indicate any differences in fruit set due to treatments. The length of laterals also was unaffected by bloom sprays.

The 1967 experiment compared the effect of a pre-bloom GA spray as well as bloomtime sprays on cluster looseness. Also included were split applications of the standard single post-bloom shatter spray. Some grower opinion holds that two post-bloom applications will result in larger berry size than can be obtained with an equivalent single application.

About 10 days prior to bloom vines were thinned to 16 to 18 clusters and the 10 ppm pre-bloom spray was applied. Bloom sprays consisted of 10 ppm GA applied to vines at both the 20 and 80 percent bloom stages. The standard post-bloom spray of 40 ppm was applied at shatter while the split applications were 20 ppm applied at shatter and 20 ppm applied 7 days following shatter. In this experiment there were 4 replications of four-vine treatments.

Just before bloom flower buds on the three uppermost lateral stems of 16 clusters per treatment were counted. These counts were compared with the number of berries on the same laterals at harvest to determine actual berry set. The number of berries per centimeter was determined for the same three laterals.

The results in the table show that bloom sprays of GA had no effect on berry set. The pre-bloom application was the only treatment which significantly reduced berry set below that of unsprayed control vines. There were no differences between treatments in number of berries per centimeter of lateral. Length of laterals tended to be greater on bloom sprayed clusters, but the differences were not significant.

In this experiment GA applied during bloom did not increase berry weight significantly. As was expected post-bloom sprays produced the largest berries. Splitting the post-bloom application generally resulted in greater berry weight than when single applications were used. Total soluble solids percentages obtained at harvest indicate post-bloom applications delayed maturity.

Results of two years' experiments do not show any measurable berry thinning effect from bloom sprays of GA under Arizona conditions. The use of bloom sprays and, particularly, pre-bloom sprays of GA will be investigated further this coming season.