

HORTICULTURIST

Raspberry Fields at Duluth Need Winter Protection

DR. W. G. BRIERLEY, University Farm, St. Paul

IN the fall of 1937 growers at Duluth asked for help to determine the cause of severe injury which frequently occurred in raspberry fields in that locality. The injury was evidenced by drying of canes in the growing season accompanied by a sudden drop in crop volume. Because the canes dried it was believed that supplemental irrigation might solve the difficulty.

Study of the problem was begun in 1938 and continued until 1944. The field work was carried on at various times by R. E. Nylund, H. E. Andrews, O. C. Turnquist and Violet L. Clark. During this time no beneficial results were obtained from irrigation. Rainfall was ample, soil moisture was adequate throughout the growing season, cane growth showed no checking such as would be caused by drouth, and berry size declined at a normal rate during the picking season. No beneficial effects followed heavy applications of commercial fertilizer or manure. Cover crops did not develop well enough after the picking season to affect maturity of new canes. Drying of canes and the sudden drop in crop volume appeared to be related to a type of winter injury. Study of this phase of the problem demonstrated that injury to the canes and buds was largely due to unseasonal bud activity during warm spells in winter. The reputedly hardy Latham variety, known to be able to withstand temperatures as low as -49° F., was found to be very sensitive to warm spells which led to early stages of bud activity and to severe injury during subsequent cold weather.

Winter Protection

After the cause and nature of the injury had been determined attention was directed to winter protection methods and effects. An oddity of this return to an old field practice is that investigations have shown that the canes do not need to be protected against severe cold, which they can endure without injury, but need protection against the effects of warm spells. By bending the canes to the

ground in late fall and either covering the tips or the entire canes they are left in cold storage all winter and are not affected by varying warm and cold spells.

Studies of the effects of protection were begun in the fall of 1942 when comparable plots were selected in 8 well managed fields. Plots in each field were tip covered in mid-October. These were uncovered in the spring of 1943 before the buds developed and records of injury made after growth was well advanced. Results of this protection compared to plots given no protection are shown in Table 1. In 4 of the 8 fields no injury occurred in the protected plots and in the other fields injury did not exceed 5 percent. On all protected plots injury averaged 2.5 percent. Such injury was largely to buds on the arched portions of the canes. In the plots given no protection injury varied from 30 to 55 percent and averaged 40 percent as shown in Table 1. In some of these fields injury varied widely on different elevations and slopes. The figures shown are averages for each field. This table shows that the widespread and severe injury that occurred in 1942-1943 was reduced by tip covering to a negligible percentage.

In the fall of 1943 the study was confined to 3 selected fields. Cov-

ering was done on the dates shown in Table 2. On each date in each series of plots one plot was tip covered, another covered completely, and a third left with no protection. The canes were uncovered in the following spring before the buds developed and records of injury made after growth was well advanced.

The effects of the two methods of protection compared to no protection are shown in Table 1. As in the previous season there was slight injury in the tip covered plots ranging up to 5 percent and averaging 3 percent. Plots completely covered with soil showed no injury. In the unprotected plots injury varied widely in the different fields. In parts of one field injury was as high as 80 percent. Average injury in the 3 fields amounted to 50 percent of the total cane length. That there was so little injury in the plots tip covered in 1943 is of particular interest because there was practically no snow protection for the arched portion of the canes during the winter. In most winters growers can depend on enough snow to cover the arched canes thus adding further protection against injury. In 1943-1944 tip covering was successful without snow protection.

Time of Covering

The effects of protecting canes at different times in the fall was studied in 1943. Covering must be done before the ground freezes but it was not known how early the work could be done safely. It was thought that covering while the canes were in full leaf might not be desirable. As cane

Table I. Effects of "tip-covering", "complete covering", and no protection on extent of cane injury in Latham raspberry plantings at Duluth.

Grower	% Injury to Canes				
	1942-1943		1943-1944		
	Tip Covering	No Protection	Tip Covering	Complete Protection	No Protection
A	0	30			
B	0	30	3	0	50
C	0	50	3	0	40
D	5	40			
E	5	30			
F	0	35			
G	5	55			
H	5	50	3	0	60
Average	2.5	40	3	0	50



Typical series of plots in Winter Protection Study, 1943. Left: Tip-covered. Right: Completely covered. Extreme left and right: No protection.

growth has been found to end usually by mid-September, protection, was begun on September 28 while the canes were in full leaf. Comparable plots were tip covered and completely covered on this and succeeding dates and other plots left with no protection for comparison. The results obtained shown in table 2, show clearly that there was no difference in the protection provided by covering on the different dates. Even in the completely covered plots there was no injury due to presence of leaves when covering was done early. Presence of leaves was an advantage in covering as they helped materially to hold the canes down. Apparently covering may be done safely

at any convenient time in October allowing ample time for the work before the ground freezes.

Table 2. Effect of time of protection on extent of injury to Latham raspberry canes at Duluth, 1943-1944. Extent of injury recorded June 19, 1944.

Date of Covering	Extent of Injury to Canes		
	Tip Covering	Complete Covering	No Protection
	Per cent	Per cent	Per cent
September 28	3	0	15
October 2	3	0	65
October 14	3	0	55
October 30	3	0	65
November 6	3	0	60

A Story from the Old World

ACCORDING to the article in the June *Horticulturist* on fertilizers it appears that commercial fertilizers do not supply the soil with humus and they are good just for one season. Here I give you a narrative that was given to me by my father who lived in Bohemia (now a part of Czechoslovakia).

There was a farmer who had only daughters; one of them married an ex-soldier who was not a farmer, only a home renter who worked for farmers. Farmers looked on such men as inferior beings unfit to properly operate a farm. They predicted that he would mismanage and lose the farm he got from his wife's parents. The farm already was depleted and did not yield normal crops. There was little forage for cattle, so there was not enough cattle manure for the farm. The growth of crops was small and did not have much in

roots which would increase the humus in the soil.

But this distrusted farmer had gained knowledge by being away from his home. He borrowed 800 florins (the value of a florin in American money was 40c). With this he bought fertilizers and also gypsum (land plaster) for clover. Then there was plenty of manure to apply to the soil which furnished the necessary humus. He made the farm more productive than the conceited arrogant farmers had.

After that he did not use much fertilizer. The use of fertilizer and gypsum was like priming a pump. Then the other farmers followed his example. At that time the soil in Bohemia had been farmed about 1000 years or longer. As a result it was deficient in lime and plant food. At that time there were no agricultural schools to introduce modern methods.

Tip covering can be done readily with relatively little labor and if done carefully there should be only a small amount of cane breakage. Such protection appeared to be entirely satisfactory for commercial plantings. Complete covering, although entirely eliminating winter injury did not add sufficiently to protection to justify the greater amount of labor required.

Tip Covering Pays

Although tip covering will add another operation to raspberry growing practices it apparently is very much worth-while. As the extent of injury is reflected in a comparable reduction in crop volume and income, adoption of the old practice of tip covering should materially reduce injury and pay well for the labor. As severe injury occurred in 5 of the 7 years during which the study was in progress, and as injury was satisfactorily avoided by tip covering it is apparent that raspberry growers at Duluth can profit by adopting this practice.

The sons were doing only what their fathers did, and the fathers did only what they learned from their fathers before them.

To me the above indicates that fertilizers may be useful in many cases. Indirectly they supply the soil with humus.

John P. Vikla, Lonsdale

ON KEEPING TOMATOES—Ripe ones keep well in the refrigerator, but green tomatoes will not ripen there. They should be laid without touching each other in the sun or in a dark cool place and transferred to the refrigerator or other cool place when they turn red. Or, the vines may be pulled up and hung in a basement or warm garage to allow the fruits to ripen. If, however, the fruits drop from the suspended vines they risk being bruised. Tomatoes may also be wrapped in paper and stored in a box in a fairly cool room.

A tomato ripened on the growing vine has greater vitamin value and flavor than one which is picked green.