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## DOUBLE SET IN BEANS

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Double set is a problem in beans when concentrated pod set is highly desirable as for processing snap or french beans. Under conditions of double set, bloom is initiated, but pod set is interrupted so that a few large and many small pods are developing at the same time.

Double set in New York State occurs to a limited extent most years, but can sometimes be severe with the problems being more frequent on the earlier crop.

Some years ago many lines in our variety trial suffered from double set and I traced back the temperatures at blossom time. I found there were 3 or 4 days with night temperatures around 10C or just below during the peak blossom period.

We decided to study this problem in the growth chamber and grew plants in the greenhouse until the first blossom opened when they were moved to growth chambers with a day temperature of 32C and night temperature of 8.5-9C, 18C, and 27C for 7 days.

Tables 1 and 2 give the mean number of pods per plant and seed per plant under the different night temperatures. Some varieties such as OSU 1604, Early Bird, and 5-161 and to a lesser extent BL 274 produced almost as good a yield with night temperatures of 9C or 18C. However, BL 47 and Early Wax had considerably reduced pod set (Table 1).

In Table 1 total pods regardless of size are recorded. However, some pods had only one or two seeds and so were useless. In Table 2 the mean number of seeds produced are recorded and the difference between lines was accentuated. Cold nights can reduce pod set and also produce pods with flat spots due to poor seed set which are unmarketable.

The high night temperature also had an effect and some lines set as well at 27 or 18C night temperature while others suffered from 27C night. 27C is probably a little low for this test and if the test was conducted at 29-30C it is expected there would be much more severe effect on pod set. High night temperatures are rarely a problem in New York but they can be in many other places.

When F<sub>2</sub> plants of the cross OSU1604 x E. Gallatin were screened at 8.5C for blossom set very few plants produced pods. However, the F<sub>2</sub> of OSU1604 x BL274 produced many plants which set at these temperatures.

The ability to germinate at low temperatures is unrelated to the ability to set pods under conditions of cool nights. Early Wax and Limelight are beans adapted to early planting but performed poorly in terms of pod set under cool night temperatures.

OSU1604 was selected under Oregon conditions where hot days and cool nights are common and are ideal natural conditions for selection for the ability to set under conditions of cool nights.

Table 1. Effect of Night Temperature on Pod Set

Variety	Pods Per Plant		
	Night Temperature °C		
	8.5	18	27
OSU 1604	6.0	4.4	5.3
BL 47	1.2	4.7	5.2
Blue Crop	2.4	5.1	3.1
E. Callatin	2.0	4.2	3.0
E. Wax	1.8	4.4	4.0
BL 274	3.4	5.2	5.2
BL 92	2.2	4.6	3.2
Limelight	2.9	3.7	4.3
Early Bird	6.0	3.5	4.3
23	4.5	8.0	5.0
8219	1.0	5.4	5.7
5-161	7.0	5.7	4.7

Table 2. Effect of Night Temperature on Seed Set

Variety	Seeds Per Plant		
	Night Temperature °C		
	8.5	18	27
OSU 1604	15.2	17.3	17.6
BL 47	3.6	15.3	9.6
Blue Crop	6.3	17.4	9.5
E. Gallatin	4.5	12.6	9.3
E. Wax	4.8	16.0	9.0
BL 274	14.6	14.8	12.0
BL 92	5.8	16.4	13.0
Limelight	5.8	8.0	8.9
Early Bird	15.5	13.5	20.3
23	15.5	21.5	26.7
8249	2.2	21.4	17.0
5-161	14.0	17.5	12.4