Work on this problem has been conducted at the New York State Agricultural Experiment Station for the past three years. No data will be presented in this report; rather, only general conclusions will be given.

The flat-podded rogues arise from within the parent variety itself either through mutation or complex segregation. When seed from rogue plants is increased, the resulting progeny are identical to the parent variety in all observable characteristics except for pod shape and associated characteristics. It appears that the rogues may set more uniformly and the seed matures two or three days earlier than that of the round-podded parental varieties.

Nineteen rogues from five different varieties were grown in comparison with their parent varieties. Fiber was determined in flat and round pods of comparable size and in every comparison the flat pods were considerably more fibrous.

The flat pods appear to be due to a single gene difference. However, dominance is intermediate and classification is very difficult in the F_2 population. It will be necessary to grow the F_3 populations to determine accurately the genetic nature of the problem.

All of the evidence to date indicates that flat pods arise as a mutation rather than due to a complex segregation. Some evidence suggests that the mutation may be somatic in nature.

The flat-podded rogues are much easier to thresh probably as a result of the increased fiber in the pods, and preliminary data indicate that the rogues will yield approximately 15 per cent more seed than the round-podded parental varieties.

In summary, the flat pod mutation occurs rather frequently in all varieties, but there is evidence to suggest that the frequency varies between varieties. Once the mutation occurs the rogues are favored by an increase in seed yield and easier threshing. Thus the high mutation rate and selective advantage would account for the continuing problem of flat-podded rogues in round-podded varieties.

Work is being continued to obtain more data on certain aspects of the problem, and it is hoped that a paper can be published shortly giving the complete story.

Seed Abortion in Snap Beans

John D. Atkin

In the bean breeding program at the New York State Agricultural Experiment Station, white seed has been incorporated into several colored-seeded varieties by the classical backcross method involving six backcrosses to the recurrent parent. It was noted in some lines that the white-seeded segregates of the F_2 of the 6th backcross generation yielded less seed per plant than did the colored-seeded segregates. Since it is possible to distinguish heterozygous plants in the segregating generations, this work has been continued into the F_5 of the 6th backcross by simply planting seed of heterozygous plants and then measuring seed yield of the white and colored plants in the segregating populations.

Repeated experiments have indicated that this reduction in yield is actual rather than something due to chance variation. Green pod yield is not influenced as there is no reduction in the number of pods or the number of ovules per pod. The reduction in seed yield is due to an actual abortion of ovules of the white-seeded segregates.

At one time it was thought that the condition might be aggravated by environmental conditions in New York. Experiments conducted at the Asgrow Research Center at Twin Falls, Idaho, during the summer of 1960 indicated that abortion definitely can occur in that area.

The inheritance of this characteristic has not been completely worked out but certain deductive statements can be made: (1) abortion is not due to white seed in and of itself; (2) abortion is probably conditioned by more than one gene and is probably due to complementary action of a gene or genes for abortion and white seed color; and (3) preliminary experiments suggest that the abortion gene or genes actually come from the colored-seeded recurrent parent.

Work on the abortion problem is continuing.

The Effect of Seed Color on Pod Color in Snap Beans.

John D. Atkin and Walter H. Pierce

During the last few years there has been a shift from colored to white-seeded snap beans for processing. This has necessitated the development of new white-seeded varieties, and it has been rather difficult to obtain white-seeded lines with dark green pod color. There has even been some thought that the basic color gene is necessary for the production of dark green pod color. The fact that some of the Blue Lake varieties combine dark pod color and white seed is ample proof that this is not true. However, a problem does exist in that it is difficult to combine dark green pod color and white seed.

White-seeded lines have been developed at the New York State Agricultural Experiment Station by backcrossing white seed into colored-seeded varieties. Genetically these white-seeded lines are practically identical to the recurrent parents except for seed color. However, when these lines are canned they are slightly lighter green in color than the recurrent parent varieties. It has been observed that this color difference increases with sieve size.

A preliminary experiment was conducted at the Asgrow Research Center at Twin Falls, Idaho, while the senior author was there on sabbatic leave during the summer of 1960. Two samples of Tendercrop and two samples of GB-13 (white-seeded Tendercrop type derived by backcrossing) were canned. In one sample of each variety, seeds were removed by splitting the pods longitudinally before processing and only the pods were canned, but the other sample of each variety was canned with the pods intact.

In the normal samples, Tendercrop pod color was considerably darker than that of GB-13, but in the de-seeded samples the pod color of these two lines was practically identical. Although colored seeds caused the pods to appear darker, the dark color was somewhat dull in appearance. The white-seeded and de-seeded colored samples had a much brighter appearance than the colored-seeded sample.