NEWER BABY LIMAS

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Five new green-seeded baby lima bean lines [568 BG (NJ 698), 668 BG (NJ 699), 868 BG (NJ 6910), 968 BG (NJ 6911), and 1168 BG (NJ 6912)] were increased in 1969 by Joseph Steinke at the South Jersey Experiment Station, Bridgeton, and tested at Georgetown, Delaware; Bridgeton, New Jersey; and Beltsville, Maryland. These lines, resistant to downy mildew strains A and B, are earlier, shorter, and with greener seed coats and cotyledons than Thaxter, Early Thorogreen, G 1, and G 2. Since the beans mature at one time, these lines are well adapted for mechanical harvesting. All are vigorous germinators.

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APPEARANCE OF "C" STRAIN DOWNY MILDEW

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In 1969 we discovered a third race of the downy mildew fungus of lima bean, Phytophthora phaseoli. Thaxter described the fungus in 1889. The second race, known as "B", was found near Elmer, New Jersey, in 1958, and the new and third race was isolated from pods of Dover bush baby lima bean which resists the A and B races of the fungus. It was found in close proximity to the spot where race B was first isolated. Greenhouse inoculations to seedlings of Dover bush lima bean (formerly G 1) proved it to be distinct from races A and B; it is, therefore, called strain "C".

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THE UTILIZATION OF CONTROLLED ENVIRONMENT IN SCREENING FOR COMMON BLIGHT RESISTANCE

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Common blight, caused by Xanthomonas phaseoli, is a high temperature disease which occasionally causes serious damage to susceptible varieties in New York state. In this area environmental conditions are not reliably favorable, however, for conducting a screening program in the field. We have turned to the use of growth chamber, therefore, in our screening work. Preliminary tests at various temperatures revealed that the disease was more severe at 85° F than at lower temperatures. At 90° F the new growth of bean plants failed to develop chlorophyll.

Redkote, as a variety does not have an appreciable level of resistance to common blight, but several lines with moderate levels of resistance have been selected out of it through the use of this controlled temperature. Apparently these selections derived some resistance from Great Northern No. 1, because Great Northern No. 1, the variety from which Redkote derives its halo blight resistance, also has a fair degree of resistance to common blight.

We have initiated a program of introducing more common blight resistance into Redkote. Great Northern Nebraska No. 1 selection 27 from D. P. Coyne appears to be the best source of resistance. A selection out of a complex cross by A. P. Lorz of Gainesville, Florida also appears to have superior resistance, but we do not yet have it purified for this character.

The use of a controlled temperature of 85° F introduces an increased selection pressure for high levels of resistance, for plants with only moderate levels of resistance at this temperature soon recover and grow normally when placed in the greenhouse at about 70° F.

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A SYSTEMATIC SYSTEM FOR INCORPORATING HIGHER LEVELS OF HALO BLIGHT RESISTANCE

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Redkote, a recently released "halo-blight-resistant" red kidney-type bean derives its blight resistance from Great Northern No. 1. It is highly resistant to race 1, and fairly tolerant of many strains of race 2 of the halo blight pathogen, but some strains of race 2 are fully virulent on it. Although good seed can still be produced in New York state under a system of inspection and certification, the threat of a highly virulent strain of the halo blight pathogen becoming established in Redkote has prompted us to continue our halo blight breeding program.

For some time we used a mixture of race 2 strains of the highest virulence available in our screening program. Our results were thoroughly confusing, and it became apparent that some strains probably are fairly virulent on most of the breeding lines that we have. Recently we started a systematic program of introducing additional genes for resistance to halo blight into Redkote. We use as inoculum a strain of race 2 that is fully virulent to Redkote, but not to many other sources of resistance. To ensure that this level of virulence is maintained, the inoculum is maintained in Redkote plants.

The program now consists simply of crossing Redkote with various other sources of halo blight resistance, and after one or more generations the resistant segregates are backcrossed to Redkote. We are now testing the