

Two varieties of soybeans tolerant of spider mites

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Plastic cages one inch in diameter and height mounted on the underside of soybean leaflets, into which one female mite was introduced.

Soybean materials that showed most tolerance to the two-spotted mite, *Tetranychus urticae* K., in greenhouse tests were USDA Plant Introduction P.I. 88,492 and UC-228.

OBSERVATIONS in 1966 indicated that some of the Midwest soybean varieties or selections differed in the amount of spider mite infestation and damage when grown at the West Side Field Station, Five Points, California. This was true also among the hundreds of varieties in a world collection of soybeans. Of these none was clean, but a few indicated some plant tolerance to mites.

Soybean varieties appearing to be the most tolerant were sown at three dates in a greenhouse in 1967. Mite biotic potential or development was measured by introducing a single female two-spotted mite, *Tetranychus urticae* K., into a small plastic cage mounted on the underside of a soybean leaflet (see photo). The mites were transferred carefully by means of a 1- to 3- bristled camels-hair brush to the leaflet surface in the cage. One-inch plastic cages were cemented to a bent hair-clip so they could be clamped lightly on a leaflet, and had a soft foam backing to reduce leaflet injury. Ten replications of these cages enclosing a mite were run on 5 plants of each variety under test.

Mite counts were made one and two weeks after their introduction during the first season, and only every two weeks in later tests. The first week's count was made in the greenhouse with a hand magnifying glass to examine the mites within the cages on the leaflets. The two-week count with the use of a microscope was more satisfactory because the leaflets

and cages could then be cut free and brought to the laboratory where all the live eggs, nymphs, and adults that had developed in each cage could then be accurately counted. The degree of tolerance of any variety could thus be assessed by the amount of mite development, particularly in relation to the numbers developing on the susceptible check variety, Chippewa.

The results shown in table 1 indicated that there were some differences in mite development among the varieties tested. The first season's studies indicated possible tolerance to mites for the following four varieties or USDA plant introductions: Guelph, P.I. 88,492, P.I. 70,212, and P.I. 157,409.

A summary of the results from 14 greenhouse tests on mite tolerance is given for many soybean varieties in table 2. Most of the varieties that were rated a poor 3 or 4 (scale: 1 = excellent tolerance, 5 = extremely susceptible) at two weeks during 1968 were omitted from the table. P.I. 88,492 and UC-228 were the only varieties showing good to excellent mite tolerance. They both resulted in 81 per cent fewer mites than the susceptible check variety, Chippewa.

These resistant varieties will be crossed to several commercially acceptable soybean varieties. From these crosses it is hoped that plants will be found in segregating generations that combine mite tolerance with good agronomic performance under California conditions.

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these studies. Seeds of the varieties and selections tested were obtained from Dr. Benjamin Beard, Oilseed & Industrial Crops Research Branch, A.R.S., Brawley; and Dr. Paul Knowles, Department of Agronomy, U.C., Davis. A part of this research was made possible by funds received from an Oil Seed Crops Research Trust.

TABLE 1. THE AVERAGE NUMBER OF SPIDER MITES ON SEVERAL SOYBEAN VARIETIES, TWO WEEKS AFTER THE INTRODUCTION OF A SINGLE FEMALE INTO SMALL LEAFLET CAGES, DAVIS, 1967

Variety or plant introduction	Date of introduction		
	5/26/67	6/9/67	6/22/67
P.I. 88,492	10.7	5.0	16.3
P.I. 70,212	10.8	12.6	13.4
Chippewa	..	11.6	22.1
P.I. 84,976	16.4	11.1	22.0
P.I. 85,437	26.6	13.7	22.2
P.I. 157,409	10.3	6.5	9.3
P.I. 80,470	28.2	11.2	13.5
P.I. 86,449	19.2	14.7	20.5
Guelph	8.4	5.2	8.6
P.I. 68,494	10.4	9.0	42.5

TABLE 2. SPIDER MITE TOLERANCES OF SEVERAL SOYBEAN VARIETIES, FROM GREENHOUSE CAGE TESTS, DAVIS, 1968

Soybean material*	Number of tests per variety	Live adult and nymphal mites per caged replicate after two weeks		Tolerance rating†
		Average No.	% reduction	
P.I. 88,492	3	7.0	81.0	1
UC-228	3	7.0	81.0	1
UC-208	1	10.3	72.1	2
Guelph	3	11.1	69.9	2+
P.I. 157,409	4	11.6	68.5	2+
UC-219	4	11.7	68.2	2+
P.I. 85,437	1	11.9	67.7	2+
UC-229	3	12.8	65.3	2.5
UC-218	2	13.2	64.2	2.5
UC-3,273	3	13.6	63.1	2.5
P.I. 70,212	3	14.3	61.2	2.5
UC-209	3	14.4	60.9	2.5
UC-220	2	16.1	56.3	3
Wayne	4	25.5	30.9	4
Chippewa	14	36.9	..	5

* All U.C. materials originally from the United States Department of Agriculture, Plant Introductions.

† 1 = excellent tolerance, 5 = extremely susceptible.