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'POAMOHO' POLE BEAN

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'POAMOHO' POLE BEAN

Richard W. Hartmann

'Poamoho' is a vigorous, productive pole bean that produces long, straight, flat pods of the type preferred by Hawaiian consumers. The pods are stringless, however, unlike those of other similar cultivars. 'Poamoho', like the similar 'Manoa Wonder', is resistant to root-knot nematodes (*Meloidogyne incognita*) and has some field resistance to *Rhizoctonia*. It is intended to replace 'Manoa Wonder' but is an improvement because it is earlier and more productive, and the stringless pods are tender even when overmature.

ORIGIN

'Poamoho' is the result of more than 10 years of effort to add better quality (stringlessness and tenderness) to the root-knot nematode-resistant 'Manoa Wonder' and still keep the long, flat pods preferred by the Hawaiian market.

P.I. 289372, a bean introduced from Hungary and received from the Western Regional Plant Introduction Station at Pullman, Washington, was used as a source of unusual length (up to 9–10 inches at times) combined with a lack of strings. This line, however, has weak growth and poor productivity under Hawaiian growing conditions, even when free of diseases. A cross between P.I. 289372 and 'Manoa Wonder' was made in 1970. Progeny from this cross were selected for four generations for root-knot nematode resistance and lack of strings. The best of these selections was crossed in 1973 with a different root-knot nematode-resistant line (an F₄ from a cross between E8207, a line received from Ferry-Morse Seed Co., and P.I. 165426, a highly root-knot nematode-resistant introduction from Mexico, also received from the Western Regional Plant Introduction Station at Pullman).

Selection continued for six generations for lines that were free of strings, productive, and resistant

to root-knot nematodes, and had long, flat pods. However, no selection combined nematode resistance and lack of strings with sufficiently high productivity. Therefore, a backcross to 'Manoa Wonder' was made. This new segregating population was selected for seven generations for long, straight, smooth, stringless, tender pods, root-knot nematode resistance, and high productivity. The seven best selections were evaluated in 1980 in a yield trial in comparison with 'Manoa Wonder' and 'Hawaiian Wonder' (Table 1). All breeding lines outyielded the two older cultivars significantly, were earlier, and had higher quality, so plans to introduce one or more of them were considered.

As the next step, seeds of the three lines with the best pod characters, listed as 10-2, 10-3, and 10-5 in Table 1, were collected from small plots grown along with the yield trial and replanted for further evaluation and increase before introduction. However, these lines showed variability for several traits and, in the following generation, segregation was noticed for flower color, which had previously been uniform. Apparently, in the planting of June 25, 1980, there was some, and perhaps much, natural crossing among the lines listed in Table 1 (the only materials in the planting). The female parent involved in the pedigree of 'Poamoho' is known to be line 10-2 (full designation: 77-10-8-2-4-3-2), which had lavender flowers. The male parent involved, because of the later segregation of white flowers, must have been either line 12-4 (77-12-3-1-1-3-4-1) or line 12-8 (77-12-3-1-1-3-8-1), the only lines in the planting with white flowers. Lines 77-10 and 77-12 differ only in that two sister plants from the same line were used in the backcross to 'Manoa Wonder' made in 1977. Following the 1980 outcross, six more generations of selection eliminated the new segregation. The full pedigree of 'Poamoho' is illustrated in Figure 1.

Table 1. Yield (in pounds per 20-foot plot) of breeding lines compared to 'Hawaiian Wonder' and 'Manoa Wonder' in comparative yield trial planted at Poamoho Farm on June 25, 1980

<u>Line</u>	<u>Yield^z</u>
Breeding line 10-5	44.4a
Breeding line 10-2	41.1ab
Breeding line 10-1	41.1ab
Breeding line 10-4	39.5ab
Breeding line 10-3	34.8ab
Breeding line 12-8	34.2ab
Breeding line 12-4	33.7b
Manoa Wonder	23.3c
Hawaiian Wonder	18.0c

^z Means followed by the same letter are not significantly different at the 5% level of significance by Duncan's Multiple Range Test.

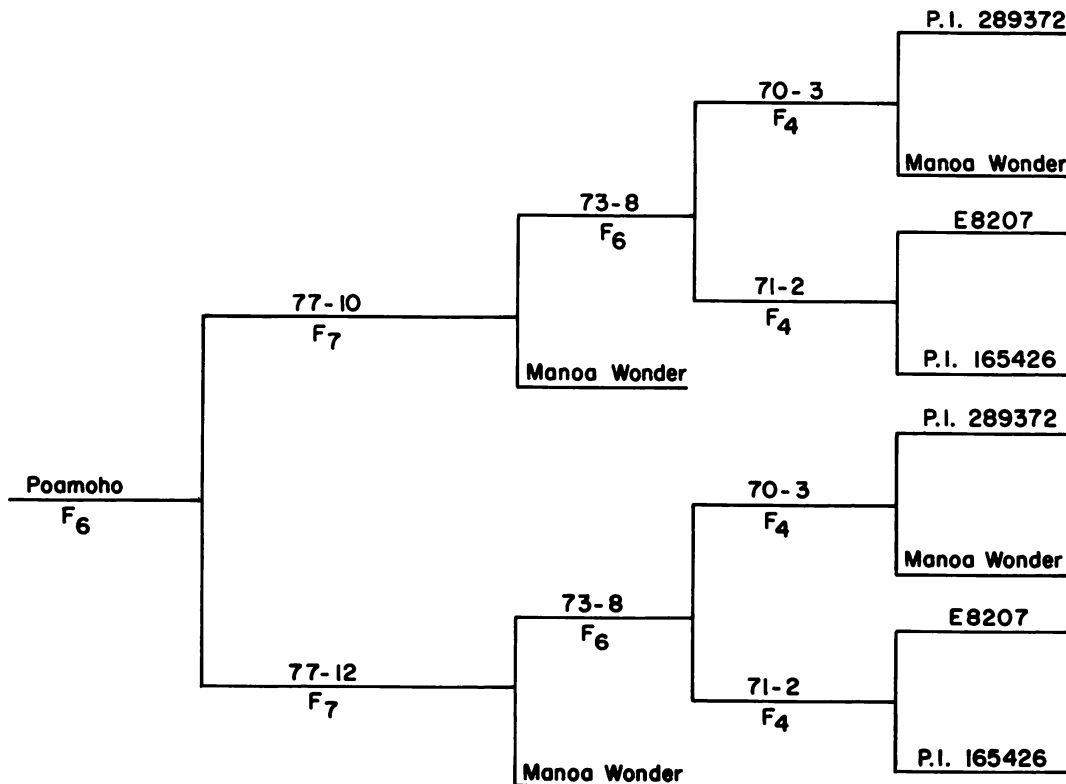


Figure 1. Pedigree of 'Poamoho' pole bean.

DESCRIPTION

'Poamoho' produces attractive, long, straight pods when grown under favorable cultural conditions. The pods in Figure 2 are all about 8 inches long and are typical under good growing conditions. However, if nutrition or water is limiting, or insect infestation is heavy, both the length and straightness of the pods may be severely affected. 'Poamoho' should be grown with ample fertilization and irrigation and good insect control. Wider spacing results in earlier production. Like its parent, 'Manoa Wonder', 'Poamoho' remains free of galls when grown in soil infested with root-knot nematodes, compared to the susceptible 'Hawaiian Wonder', which becomes heavily galled. Since *Rhizoctonia* has not been observed on 'Poamoho', it may be somewhat tolerant, as 'Manoa Wonder' is. The seeds develop rapidly, however, so frequent harvesting is recommended to obtain pods at the maximum length but without swollen seeds. But since

no strings develop, even pods that appear to be somewhat old because of their swollen seeds are still tender and usable.

'Poamoho' has been tested at experimental farms throughout the state (Table 2). The results from different farms varied widely. Some of the differences may be due to different row widths, since different farms used different spacings. Three replications were grown at each farm. No results are shown from Waimanalo Farm because all 'Poamoho' plots there were damaged by birds. The one consistent finding is that 'Poamoho' always outyielded both 'Hawaiian Wonder' and 'Manoa Wonder'. In all cases except at Pulehu (Maui), the differences were statistically significant. (Other breeding lines similar to the one that is being named 'Poamoho' were also tested; all the breeding lines nearly always outyielded 'Hawaiian Wonder' and 'Manoa Wonder'.) 'Poamoho' usually was about 3-6 days earlier, as well.



Figure 2. Harvested beans of 'Poamoho' showing indication of seed development.

Table 2. Yield (in pounds per 20-foot plot) of pole bean cultivars at five locations in Hawaii

Location	Planting Date	Hawaiian Wonder	Manoa Wonder	Poamoho
Poamoho ^z	7/8/82	15.5	12.9	16.8
Waiākea	9/2/82	23.5	21.1	33.8
Kapaa ^y	9/10/82	9.1	8.6	17.5
Lalamilo	8/18/82	28.3	26.9	40.4
Pulehu	11/16/82	36.9	42.4	44.1

^z Severely infested with thrips.

^y Severely infested with mites.

'Poamoho' is being named after the University farm at which most of the selection work leading to this cultivar was done. It should replace the presently grown 'Manoa Wonder' because it has the same kind of long, straight, flat, smooth pod, but is also stringless and tender even when older. It is slightly earlier, yields significantly more, and is equal to 'Manoa Wonder' in resistance to root-knot nematodes and tolerance of *Rhizoctonia*.

SEED AVAILABILITY

Seed samples for trial purposes (complimentary) or for purchase (\$2.50 per pound plus postage) are available from Seed Distribution Program, 3190 Maile Way, Room 112, Honolulu, Hawaii 96822.

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