

# Sweet Potatoes

## flowering induced by grafting scion on ornamental rootstock

M. P. Zobel and G. C. Hanna

**Most varieties** of sweet potatoes—*Ipomea batatas*—normally do not produce flowers under California conditions. The ability to induce flower and seed production would greatly facilitate the development of varieties with superior quality, higher yield, and disease resistance.

In 1950, some new strains of sweet potatoes were obtained from the U.S.D.A. and from the Texas Agricultural Experiment Station. Among these, two easy-flowering strains were included which proved to be of little value in the breeding program. Some of the others produced a few flowers, while still others failed to flower. Since certain of the latter possessed some of the desired characteristics, a number of methods were tried to induce flowering. These treatments included girdling, sugar sprays, hormone applications, controlled length of day, and growing in various volumes of soil. None of these produced consistent results. Some plants produced buds but these abscised before they developed into flowers. Most of them failed to respond to the treatments. In the winter of 1951–1952, grafts were made with the nonbloomers using the easy-flowering varieties both as rootstocks and scions. The results were encouraging but highly variable and inconclusive as only a slight stimulation of flower production occurred.

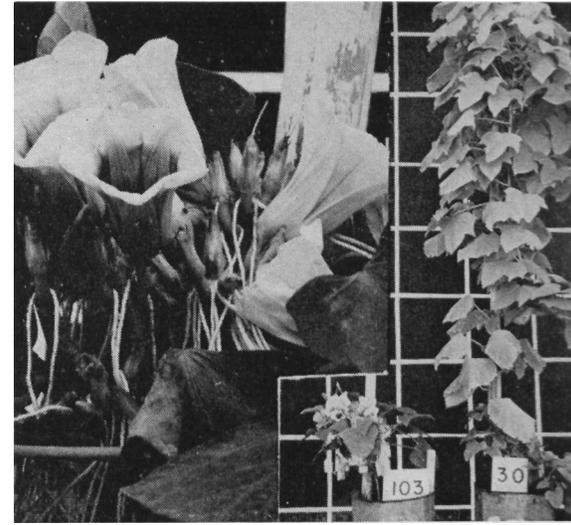
### Tests in 1952–1953

During the winter of 1952–1953, a more extensive set of grafts were made to explore further this method of flower induction. The following treatments were tried: 1, easy-flowering sweet potato scion on nonflowering root; 2, nonflow-

ering scion on easy-flowering root; 3, nonflowering scion on easy-flowering root with the foliage growth of the rootstocks kept trimmed off; 4, easy-flowering scion on easy-flowering root; 5, nonflowering scion on nonflowering root; and 6, rooted cuttings. As in the 1951–52 tests, the results were inconclusive, but the results did indicate that the blooming of the easy-flowering portion of the grafted plant did not stimulate flower production in the nonflowering portion.

It was thought that the slight stimulation of flower production in the nonflowering noted in 1951–52 could be due to the limited storage of carbohydrates in the roots of the easy-flowering stock. This might result in a build-up of materials within the aerial portion of the plant and thus induce bud formation. Following this reasoning, grafts were made in 1952–53 on some closely related species commonly found in many home flower gardens. They were selected because they have no storage roots. These species are: Morning Glory—*Ipomea purpurea*—variety Heavenly Blue, Cardinal-climber—*Quamoclit sloteri*—Moonflower—*Calonyction aculeatum*—and Cypress-vine—*Quamoclit pennata*. The method of grafting was the cleft graft. After insertion of the scion, the union was tightly wrapped with a strip of rubber made from a cut rubber band. No other treatment was given. A total of 125 such grafts were tried of which 95% were successful. Grafts were successful on all except Cypress-vine which has a stem smaller than that of the sweet potato; however, even these grafts took and grew for a short time before dying.

On many of the plants flower buds began to appear about one month after grafting or soon after growth of the scion



Rooted cutting—30—compared to a dwarfed scion of the same variety growing on morning glory root—103. Left portion of picture is a close-up showing the heavy production of buds and flowers of plant 103.

was resumed. These buds continued to appear, develop, and produce normal flowers. In some cases the plants were dwarfed—plant 103—but in others the growth of the scion was normal. The response of the sweet potato scions was the same regardless onto which ornamental they were grafted. The grafts made on the easy-flowering sweet potato roots on the other hand grew normally but flower production was no better than where they were on their own roots—rooted cuttings or grafted. The accompanying table shows the relative degree of flower production of the various combinations. Frequently the sweet potato grafted on a sweet potato root produced buds but the buds abscised shortly after formation. This occurred also when the plants were rooted cuttings, but not when the sweet potato scion was grafted on a morning glory root.

### Continuing Studies

The reasons for the increased flower production when a sweet potato scion was grafted on an ornamental rootstock are not completely understood because not all plants produced flowers in equal abundance. In fact in a very few cases the plants failed to develop buds into flowers or to even produce buds. This individualism of the sweet potato plant in its blooming habit has been recognized for some time but not understood. Research is continuing to determine the factors that induce flowering; meanwhile the plant breeder can utilize this technique of grafting sweet potatoes on ornamentals as a tool in his unending search for better varieties.

M. P. Zobel is Assistant Specialist in Vegetable Crops, University of California, Davis.

G. C. Hanna is Olericulturist, University of California, Davis.

The above progress report is based on Research Project No. 1175.

Degree of Flowering as Affected by the Root on Which the Plant Was Grown

	Variety or seedling used as scion								
	B5941	Sunnyside	B5999	Orlis	15-S-6	B-2	11-2 x B5999-4	15-S-6-2 x B5999	11-2 x B5999-7
Rooted cutting	None	None	Few	None	None	None	None	None	None
Grafted on own root	None	....	Few	....	....	....	....	....	....
Rootstock T2748 (easy flowering)	None	None	Few	....	Moderate	....	....	....	....
Morning Glory	None	Many	Many	Many	Many	Moderate	Many	Many	Many
Cardinal-climber	Moderate	Many	Many	Few	....	....	....	....	....
Moonflower	Moderate	None	Many	Moderate	....	....	....	....	....