

## Herbicides Replaced Backbreaking Hand Weeding in California Vegetable Fields

*U.S. Pesticide Benefits Case Study No. 26, May 2011*

*Leonard Gianessi and Ashley Williams*

Use of the short handled hoe (el Cortito) was the primary weed control method for most vegetable crops in California from the early 1900s through the 1960s. The short handled hoe was 8-24 inches in length and its use required workers to bend over at the waist to bring their eyes closer to the ground. When bending, workers could clearly distinguish between weeds and crop plants. Typically, the short handled hoe was used for 28 hours per carrot acre and 45 hours per celery acre [1],[2].

The use of laborers for removing weeds was facilitated by low wages (10¢/hr) and a large number of available workers. The average farm worker wage rate increased to \$1.00 per hour in the early 1960s. Several factors led to this increase: a crackdown on illegal entry of farm workers, the push for farm labor unionization, and the end of the Bracero program in 1964. With the increased costs and difficulties of obtaining qualified farm labor, emphasis was put on chemical herbicide research to control weeds in vegetable crops [3].

Farm workers made numerous complaints against the short handled hoe, stating that they suffered permanent back pain as a result of using the hoe for extended periods of time. In 1972, California Rural Legal Assistance (CRLA) petitioned the California Industrial Safety Board to ban the use of the short handled hoe as an unsafe tool for workers to use. In 1975 the Industrial Safety Board issued the regulation that permanently banned the use of the short handled hoe in California.

The predicted dire economic effects of the ban on the short-handled hoe did not materialize because growers switched to the use of economical, effective chemical herbicides [4].

The use of herbicides greatly reduced the costs of removing weeds in comparison to hand labor. In 1960, the cost of the herbicides and their application was \$10/acre in comparison to hand hoeing costs of \$100/acre for spinach, \$80/acre for celery, \$125/acre for onions, and \$400/acre for strawberries [5]. The use of herbicides is credited with reducing the use of the short handled hoe in California onion fields by 120 hours/acre, which is equivalent to 2 million hours/year [6].

### References

1. Adams, R.L. 1938. *Seasonal Labor Requirements for California Crops*. University of California Agricultural Experiment Station. Bulletin 623, July.
2. Lange, A.H. and R.A. Brendler. 1965. Weed control in transplanted celery. *California Agriculture*. February.
3. Agamalian, H.S., et al. 1967. Pre-emergence herbicides for weed control in lettuce. *California Agriculture*. October.
4. Agamalian, H.S. 1992. Evolution of weed control in vegetables and its many benefits. *Proceedings of the California Weed Science Society*.
5. Ashton, F.M. 1960. The major problem in vegetable crop production – weed control. *Proceedings of the California Weed Science Society*.
6. Nylund, R.E., et al. 1958. Comparative costs of weeding onions by hand or with Monuron, CIPC, and CDAA. *Weeds*. July.



Herbicide treated carrot row (left)  
Weedy, untreated row (right)



El Cortito



Field workers using short handled hoes