

# Heterosis in a Broad Range of Alfalfa Germplasms

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## Introduction

Increasing alfalfa forage yield is a priority of the Iowa State forage-breeding program. One way to increase yields may be to develop hybrid alfalfa cultivars. Crosses between common, purple flowered (sativa) alfalfa and wild, yellow-flowered (falcata) alfalfa often produce hybrids that have significant yield improvements. The objective of this experiment was to identify falcata populations that produce hybrids superior to sativa cultivars or hybrids.

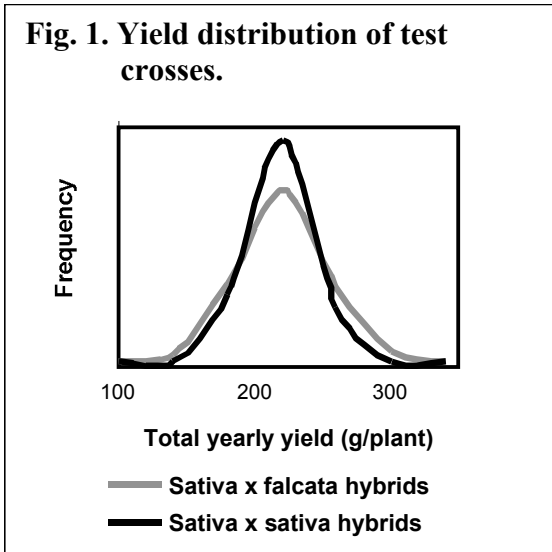
## Materials and Methods

One hundred six falcata genotypes and 19 sativa genotypes were crossed to sativa germplasm to test hybrid performance. The falcata genotypes were obtained from the USDA plant introduction collection, and represented wild populations from western Europe though northern China. The experiment was planted in August 2000 at two

Iowa locations, Ames and Nashua. Forage yield was measured in three harvests in 2001 and 2002.

## Results and Discussion

On the average, no yield differences were seen between sativa × falcata hybrids and sativa × sativa hybrids on an experiment, location, or yearly basis (Table 1). Sativa × falcata hybrids out-yielded sativa × sativa hybrids during the first harvest, but the situation was reversed for the second cutting (Table 1). In general, falcata plants have slower regrowth than sativa. Our data suggest that if the regrowth of falcata could be improved, the sativa × falcata hybrids could perform better over the entire year. In any case, the top yielding sativa × falcata hybrids out-yielded the top yielding sativa × sativa crosses (Figure 1). In this study we have been able to identify particular falcata genotypes that produce high yielding hybrids in combination with sativa. These falcata germplasms will be intercrossed to form an improved falcata population for use in future hybrid alfalfa cultivar development.



**Table 1. Yield comparisons of sativa × sativa crosses, sativa × falcata hybrids.**

Entry type	Experiment-wide	Year		Location		Harvests		
		2001	2002	Ames	Nashua	First	Second	Third
----- g plant <sup>-1</sup> -----								
Sativa x sativa	219a	157a	280a	229a	210a	90b	75a	55a
Sativa x falcata	219a	160a	279a	223a	215a	97a	70b	52a

Indicated differences significant at the 0.05 level