Effectiveness of Selection Within Fuggle Hops (\textit{Humulus lupulus L.})

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The hop is a long-lived dioecious perennial, which produces annual aerial shoots each year from perennial crowns. Space-planted crowns are pruned back annually, and each spring new vines are trained on twines supported from an overhead trellis. The female vines bear papery cone-like inflorescences, which when cured constitute the hops of commerce. New yards and vacant spaces in old yards are planted with rhizome sections obtained from established crowns. All plants of a single variety would be the same genetically, barring the occurrence of somatic changes or the establishment of chance seedlings. Any variation among plants then would be due to somatic mutants, seedling segregates, and environmental effects or diseases, particularly those caused by viruses.

The Fuggle variety has been in existence, and propagated vegetatively, for almost 100 years. According to Percival (8) the original plant was a casual seedling which appeared about 1861 in a flower garden of a George Stace of Horsmonden, Kent, England. Cuttings were introduced to the public by Richard Fuggle of Brenchley, about 1875. The variety was later introduced from England into the United States and now occupies approximately 60% of the hop acreage in Oregon. It is not grown extensively in this country outside of the Willamette Valley.

As a general rule, Fuggle yards in Oregon are uniform in plant type. However, observations in commercial yards over a period of years indicate that wide differences in vigor exist from hill to hill and from year to year. Some plants exhibit symptoms of virus infection. A few are off-type indicating that possible mixtures are present. The incidence of plants showing virus symptoms and varietal mixtures appears to be low, and most of the visible variation is due to differences in vigor.

The purpose of the study reported here was to furnish information regarding the value of selecting planting stock from superior plants in commercial yards to improve existing hop varieties. A secondary objective was to determine the length of time required for Fuggle to reach maximum production.

MATERIAL AND METHODS

In 1948, harvest weights were obtained from 750 individual hills in a commercial yard of Fuggle near Corvallis, Oregon. The planting in which these yields were measured was in its fifth year of production, and no replanting had been done during the period. Observations indicated that there were no serious disease problems, and all plants appeared to be of the Fuggle variety. The range in harvest weight per hill was 11.5 pounds (1.9 to 13.4 pounds). The average yield was 6.48 pounds per hill, and the standard deviation was 1.615 pounds. Harvest weights appeared to follow a normal distribution. These data were previously published by Keller (5).

A series of plots, in which 5 hills were planted with rhizomes taken from each of the 10 low-yielding and the 10 high-yielding hills, was established in 1949. In 1950, 1951, and 1952 an additional replication of 5-hill plots of the 20 selections was planted each spring until 4 replications were established (Table 1). Data were obtained from this trial through 1956, but data collected from replication I in 1955 and 1956 and replication II in 1956 were not used in the final analysis so that data from at least 3 replications could be furnished for each age of planting. This made