Inheritance of Fatty Acid Content in the Seed Oil of a Safflower Introduction from Iran

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THE increasing interest in the oil of safflower (Carthamus tinctorius L.) for edible purposes has been based on its high level of polyunsaturation or, in other words, on its high content of linoleic acid. This interest has prompted safflower researchers to take a closer look at the fatty acid composition of their materials. Work at this station (2, 3) and independent work in Australia (1) and Pakistan (4) uncovered safflower types with a very low level of linoleic acid and a high level of oleic acid. The difference in oil quality from the normal type was due mostly to a single gene. The fatty acid constitution of these types is similar to that of olive oil.

In 1959, E. M. Nelson, Agricultural Advisor with U. S. Operations Missions in Iran, obtained a sample of safflower seed from a shop in the town of Mianeh, in the Azerbaijan. It was given the plant introduction number 254,717 by the U. S. Department of Agriculture and was grown at the Regional Plant Introduction Station at Pullman, Washington, in 1959. Oil from bulk open-pollinated seed of this introduction had an iodine value of 121.5. This seed (accessioned U.C. 59–779) was sown at Davis, California, in 1960. Measurements of the iodine value of the oil from 49 plants therefrom gave the following: 70% were between 109 and 121; 18% were like commercial safflower with iodine values between 139 and 144; and 12% were between 130 and 138. Plants grown from open-pollinated seed of the first two groups bred true in 1961, except for assumed outcrosses of the year before. Plants from the last group fell into three groups with low, intermediate, and high iodine values in an approximate 1:2:1 ratio. It was obvious that we were dealing with a safflower introduction having another type of oil, one that was intermediate in iodine value between the commercial type and the types from India and Pakistan with iodine values between 80 and 90. It was apparent also that its difference from the commercial type probably was determined by one gene.

MATERIALS AND METHODS

Crosses were made in 1961 between the Iranian introduction (termed Iran 59–779) and both the commercial variety 'N-10' and India 57–147 (an Indian introduction accessioned U.C. 57–147), the latter with an iodine value in the range 85 to 95. N-10 and India 57–147 were crossed also, a repetition of a cross already reported (3). Some F1 plants were grown in the greenhouse during the winter of 1961–62 to provide seed for F2 in...