

Desert Plants

A quarterly journal devoted to broadening knowledge of plants indigenous or adaptable to arid and sub-arid regions, to studying the growth thereof and to encouraging an appreciation of these as valued components of the landscape. Subscription price is \$10.00 per year.

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Editorial

Fitness and Flexibility in Relation to Selection and Propagation of Desert Plants.—Population geneticists refer to **fitness** as the degree to which a population passes on its specialized adaptive heredity unchanged to the next generation. Populations display a type of meristic variation with regard to adaptive characteristics,—a variation which often when graphed produces a “normal curve” with an adaptive peak flanked by less adaptive sides. In any desert situation where rigorous growing conditions change little from year to year, plant populations can be expected to exhibit a high degree of fitness. The rigorous environment tends to truncate the curve fore and aft since the rigor-surviving progeny which live to reproduce are those which fall closest to the adaptive peak.

But although plants must have a high degree of fitness for the present environment, their populations must also exhibit a degree of flexibility to cope with changes in that environment. There is an ever-increasing body of evidence suggesting that climate and growing conditions have indeed significantly changed even in historic times in many of the world's deserts. Generally, as fitness increases, flexibility decreases and vice versa. As a result, each population must strike a balance between fitness and flexibility. For the short term, a plant population must be fit for the present environment. But for the long term it must be flexible to meet new rigors of some unknown future situation.

Through **selection and propagation** man is now exploiting the **fitness-flexibility balance** for his own advantage. Propagation of plants by man itself implies selection. Man is selecting the plants which will reproduce. Of the hundreds and thousands of plants which are adapted to function and survive under desert conditions, man has selected a small percentage to propagate and use for his purposes. The fitness of these plants for desert conditions is truly a gift of nature. Plant breeders take the built-in flexibility, often enhance it with hybridization, and select plants with characteristics superior for utilization by man.

Mankind is now becoming the one overpowering agent of change in desert environments. Plant populations with flexibility sufficient to enable them to become commensal with man will survive where man's populations expand in the deserts. Others may pass from threatened and endangered lists to extinction. The Boyce Thompson Southwestern Arboretum is already a “Noah's Ark” of sorts for a number of desert plants which are either extinct in nature or nearly so.

When man propagates by seed, when a garden situation removes some of the rigors of the environment, or when “volunteer” plants are of suspected hybrid origin, man commonly rogues through the variable progeny to select types which suit his fancy. In this manner a large number of garden forms of desert plants have been selected over the years, many of which are totally unknown in nature. Many of these are perpetuated by man for his use through **vegetative propagation**. This latter process has had a re-birth of interest recently under the name “**cloning**.” Every plant produced by such a process is identical to the mother plant.

Man in desert areas has the capability of modifying his environment by drawing on the flexibility of natural plant populations, selecting for fitness to meet his own very specific needs, and if necessary perpetuating by clonal propagation. But preservation of entire native desert plant populations having a balance of fitness and flexibility is desirable if for no other reason than to assure an adequate range of germplasm for the future. Just as it would be impossible to preserve all of the brilliance, creativity, genius and genetic potential of the human species by saving only one female and one male for propagation purposes, so too is there a need to preserve a wide range of germplasm of each potentially useful desert plant species. Insofar as Russian Thistle (*Salsola kali*) has recently been shown to be useful, perhaps no desert plant should be allowed to become extinct in nature.