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CREOSOTE BUSH: LONG-LIVED CLONES IN THE MOJAVE DESERT[1]

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ABSTRACT

Creosote bush clones in the Mojave Desert develop by irregular radial growth, stem segmentation and the production of new stems at the outer edge of stem segments. The resulting circular clone encloses a central bare area as the central dead wood rots away. Old clones become elliptical and may exceed 20 m in length. Modern growth rates estimated from annual increments in stem wood of seedlings (0.73 mm/yr) and young clones (0.82 mm/yr) approximate those estimated for radiocarbon-dated wood samples (0.66 mm/yr). Assuming comparable growth rates through time, the extrapolated age of the largest known clone (average radius = 7.8 m) may approach 11,700 years. If growth rates have changed, that clone's age may be somewhat less.

CREOSOTE BUSH, *Larrea tridentata* (Sesse and Moc. ex DC) Cov., is a common, widespread, and often dominant plant over desert areas of the southwestern United States and northern Mexico. Numerous studies have been made into creosote bush ecology, distribution, reproduction, development, phenology, community structure, use by animals, etc. (see Mabry, Hunziker, and Difco, 1977 for summary).

Despite an extensive literature on creosote bush, its age and longevity have received scant attention. Large shrubs near Tucson, Arizona, were estimated at ages "well in excess of 100 years" on the basis that little change in size or bulk occurred during the course of a 30-year photographic record (Shreve and Hinckley, 1937). A population in southern Arizona, expanding after historically recent invasion, included plants approaching 65 years of age as estimated from counts of growth increments in stems (Chew and Chew, 1965).

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a sterile or bare area in the center. With increased age the central bare area increases in size as the satellite bushes grow away from the center. The circular shape of a clone gradually becomes elliptical (Vasek and Barbour, 1977) owing to differential growth rates within the clone. The satellite members of clones were shown by isoenzyme analysis to be genetically the same within any one clone (Sternberg, 1976). Creosote bush clones were estimated to attain ages of several thousand years on the basis of growth rates derived from radiocarbon ages of two wood samples (Vasek et al., 1975; Sternberg, 1976).

However, two radiocarbon dates constitute a narrow base from which to project age estimates. Since creosote bush habitats vary considerably with regard to soils, slopes, exposures, elevations, precipitation, etc., its growth rate is expected to vary from place to place and from time to time. Consequently, a study was undertaken to determine growth

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