THE CONTRIBUTION OF THE SOIL SURVEY TO THE GUAYULE EMERGENCY RUBBER PROJECT

F. O. Youngs

The Guayule Emergency Rubber Project is an agency authorized by Congress and set up within the U. S. Dept. of Agriculture to provide "a source of crude rubber for emergency and defense uses." It is under the administration of the Forest Service, and research is conducted by the Agricultural Research Administration. The purpose of the project is to produce as much natural rubber as possible in the shortest possible time to meet the wartime demand. The rubber so produced will have value out of proportion to its actual volume, since it will provide natural rubber to blend with the synthetic substitute in order to develop an end product of satisfactory durability.

In order that rubber may be produced quickly and abundantly, the selection of suitable soils is of great importance. The Division of Soil Survey, Bureau of Plant Industry, has been charged with the responsibility of the selection of suitable soils. The state experiment stations, notably the California and Texas stations, have cooperated and rendered invaluable service.

The work of the Soil Survey in the Guayule Project has consisted of three principal parts, viz., (1) the location of broad soil areas favorable to the production of guayule; (2) the selection of individual tracts which have soils suitable for guayule nurseries and field planting; and (3) the selection of areas having soils satisfactory for the establishment of experimental plots and tracts for the determination of soil, climatic, and cultural requirements of guayule.

SOIL REQUIREMENTS OF GUAYULE

In order to make a sound classification and selection of lands for growing guayule, it is essential to know something of the soil and climatic requirements of the plant. Unfortunately, all too little is known about these; but observation of the shrub in the field, together with interpretation of the experience and records of the Intercontinental Rubber Company and scanning of the limited literature, has given us some indications as to the probable

Guayule, *Parthenium argentatum*, is a small gray-green shrub that, to the casual observer, resembles sagebrush. It is native of the semidesert plateaus of north-central Mexico and the Big Bend of Texas. The bark, and to lesser extent the leaves, contains rubber which, in old plants of the improved strains, makes up as much as 2.0% of the dry weight of the plant. Unfortunately, plants grown in 2-, 3-, and 4-year rotations will contain much less rubber than this, 6 to 15%, depending on strain, climate, and cultural practices.

Probably even less is known about the range tolerated by guayule than about its soil requirements. Present indications are that it requires comparatively mild winters free from zero temperatures and that it prefers a semiarid climate, although it has not been demonstrated just how much cold or how much rainfall or humidity the plant will tolerate. High temperatures promote rapid growth of the shrub, but cool night temperatures may be essential to the formation of rubber.

As to soil requirements, comparatively little was known when the project was started and much remains to be learned. In accounts of the native habitat, the soil was described as developed from limestone, porous, well drained, and often stony. It was stated that in the playas or flats of finer-textured and denser soil, little or no guayule grows. Guayule now is being grown successfully, however, on certain soils as heavy as a clay. Observation of field plots, and pot experiments has given many clues and has made possible the formation of some ideas as to the requirements for healthy, rapid growth of the plant. These requirements may be listed as follows: (1) A permeable, well-drained, well-aerated soil; (2) a reasonably good supply of soil moisture for a considerable part of the year; and (3) fairly high soil fertility. Of course, infestation with weeds, plant diseases, insect pests, nematodes, and rodents deters the growth of guayule.

Most important of all, the soil should be permeable and well drained. This does not mean that it must be sandy. Even some of the more friable granular