



## ARA enters 8th year of research on strategic agricultural materials, such as rubber, tannins, oils, and fibers

**I**N A PERIOD when the federal budget for research and development totals about \$2 billion, relatively inexpensive programs, such as the Agriculture Department's research on domestic sources of strategic and critical agricultural materials, often go unnoticed. Other factors which tend to obscure such a program are the relatively ample supplies of most materials which are under study.

The Agricultural Research Administration, which carries on this program, is now in its eighth year of research on such items as natural rubber, vegetable tannins, selected vegetable fats and oils, and certain fiber plants.

The program is carried out under the terms of the Stockpiling Act of 1946, which authorized the Department of Agriculture "to make scientific, technological, and economic investigations of the feasibility of developing domestic sources of supplies of any agricultural material, or substitutes for such materials, determined by the Munitions Board to be strategic and critical."

In the last fiscal year (1953), the appropriation for this program was \$600,000. The amount appropriated for fiscal 1954, which started July 1, was \$439,500. Most of the cutback was effected by elimination of a processing research program in connection with the domestic production of natural rubber. Elimination of work on substitutes for strategic end uses of castor oil was the other major reduction. A slight increase in funds was requested for intensified production research on fiber plants, particularly kenaf as a jute substitute.

### **Variety of Natural Rubber Projects**

Rubber production programs are being carried out in California and Texas aimed at developing new strains of guayule which have higher rubber contents. Quick and inexpensive means of testing

standing fields of guayule are being studied. Work is being terminated on extraction processes and continuous process deresination.

A moving belt conveyor type of machine was considered best for continuous extraction of the 20% resin content of crude guayule rubber. Tests on a small machine of this type proved satisfactory.

Because synthetic rubber is not an adequate substitute for natural in heavy truck tires, tires were made using deresinated guayule instead of natural (Hevea) rubber. The first set of tires tested showed that the guayule was equal to Hevea in all important characteristics.

### **Domestic Tannin Sources**

ARA has found that canaigre, a desert crop grown in the southwestern United States, is still the most promising domestic source of tanning material. At present there are 50 acres of test plantings under cultivation. Improved strains with higher tannin yields have been developed and tested.

Approximately 62 tons of dried canaigre roots, produced in experimental plantings, are available for pilot plant tests of tannin extraction. Production from the pilot plant should be sufficient to permit commercial evaluation of the tannins. ARA also has 2800 pounds of seed from its experimental plantings. The seeds will be kept in storage for planting stock in case of emergency.

### **Domestic Sources of Castor Oil**

Current work on strategic oils is devoted to problems encountered in expanding castor bean production in new areas and in developing superior varieties for these areas. Programs to develop substitutes from domestic oils for castor oil are being discontinued.

The research program on castor beans

has led to the development of strains which will give good yields in various locations. Another aim in breeding studies has been to develop varieties whose seeds do not shatter easily and do not fall from the plants prior to harvesting. Test plants have been set out in 30 different locations in the South, Midwest, Southwest, and West to determine the varieties best suited to each area. A lighter-weight, more efficient machine has been developed to strip the beans.

Lubricants for jet engines must flow at  $-65^{\circ}$  F. and still retain their lubricating properties at temperatures as high as  $392^{\circ}$  F. The base for these lubricants is sebacic acid, derived from castor oil. Sebacic acid is stockpiled for this purpose. It has been found that a slight modification of compounds derived from fatty acids derived from soybeans and other vegetable oil plants gives materials which may substitute for sebacic acid. Esters of sebacic and azaleic acids obtained from castor oil and other oils are also good lubricants. A laboratory process has been developed for the synthesis of azaleic acid from furfural (derived from corncobs) and acetaldehyde (obtained from ethyl alcohol). Studies are being made of this process to increase yields and reduce costs.

### **Strategic Cordage Research Emphasized**

Research programs in the field of strategic cordage include hard fibers and hard-fiber substitutes and soft fibers.

The hard-fiber substitutes, such as sansevieria, phormium, and hemp, are used for marine cordage. Kenaf, a soft fiber, has qualities similar to those of jute.

Sansevieria, the best-known substitute for abaca in ropemaking, may be grown in Florida. One problem has been to control weed growth. A new chemical weed killer has shown promise.

ARA has found that hemp can be grown in Missouri and Kentucky. The fiber is of good quality. To avoid the need for strict controls on production by the Bureau of Narcotics, breeding programs are directed toward developing plants with low marijuana content. Low yields and lack of uniform growth are other problems to be overcome.

Phormium is being grown in northern California and southern Oregon. This is the only hard-fiber plant that has commercial possibilities for temperate climates.

Problems in kenaf production include development of disease-resistant plants and improved machines to harvest the crop. One machine under study separates the nonfiber plant material in the field.

Until large-scale kenaf plantings are under way in the Western Hemisphere, the U. S. will remain dependent for jute on sources in India and Pakistan.