

Oil From a Shrub Found in Desert May Save the Sperm Whale

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There grows in the desert of North America a lowly shrub that scientists say may save the sperm whale from extinction.

The shrub, which may be a source for a whale-oil substitute, goes by the name of jojoba (pronounced ho-Ho-ba). A hardy evergreen, commonly found in the Sonoran Desert of Arizona, in California and in northern Mexico, the jojoba has thick, leathery, graygreen leaves and—more to the point—peanut-size seeds that hold the promise of lubricating oil for industry and jobs for Indians.

The colorless, odorless oil of the jojoba seed is like no other known plant-seed oil. It is not a fat, but a liquid wax. It has virtually the same chemistry as does sperm whale oil whose commercial value accounts in large part for that mammal's place on the endangered-species list.

After evaluating recent research into the jojoba, the National Research Council the National Academy of Sciences released a report yesterday that recommended the widespread cultivation of the plant and the extraction of its oil as a substitute for sperm whale oil.

Sperm Oil Banned

The United States banned the importation of sperm oil, in late 1971, a move aimed at protecting the sperm whale. Stockpiles are now reaching depletion, and no satisfactory synthetic substitutes have been found. Only last month, officials of the General Motors Corporation complained that removal of sperm oil from its automatic transmission fluids has led to serious corrosion problems.

The research council said that, evidence “has shown conclusively that jojoba oil can duplicate sperm oil performance as a high-pressure lubricant.”

“As this is the major use for sperm oil, it is strong evidence that, technically, jojoba is a marketable commodity,” the council added.

If the council's recommendations are followed, the jojoba could become the nation's newest crop plant—“an important national materials resource,” the report said.

Although jojoba grows wild, with some plants living up to 200 years, the council said “the vagaries of weather and the remote, steep terrain, unkempt bushes and extreme heat during harvest time make it uneconomic to exploit” the natural stands.

Small experimental plantations have been established in southern California and Israel, the council said.

It takes five years for bushy jojoba plant to mature and bear harvestable quantities of seed. The plant at full growth, stands 7 to 10 feet high.

On the female plants are pods, the size and shape of acorns, that contain the seed. Under cultivation, an average annual yield of five pounds of seed can be obtained from each bush. Since most jojoba seeds are 50 per cent oil, a plantation could yield 1,000 to 2,000 pounds of oil an acre each year.

The council scientists said that plans should “begin immediately” for starting 2,000 acres of plantation to be developed over five years by establishing 400 acres a year.

In time, jojoba plantations could stretch across previously untillable arid lands in the South-western United States, many of them providing income for impoverished Indians. It was estimated that 17 Indian reservations in California and nine in Arizona were situated where they could own and operate jojoba plantations.

“This unique agricultural product,” the council said, “is well worth subsidizing. The country's need for extreme pressure lubricants, for renewable resources and for Indian economic development would be alleviated if jojoba were developed into a crop plant.”

The National Research Council's report was based on a study supported by the Department of Health, Education and Welfare. Dr. Milton Harris, chemist, was chairman of the committee that undertook the study.

The unusual chemistry of the jojoba seed was discovered in 1933. Until then, there had been only a casual interest in the plant.

A traveler to Baja California in 1789 reported that the “berries” were used to facilitate childbirth and as “an excellent remedy for cancer.” Some Spaniards in the area applied the oil as a pomade for their mustaches. Indians occasionally ate the seed raw or roasted. It has a slightly bitter, but not unpleasant, taste. In large amounts, it is reported to act as a strong laxative.

Few Details Recalled

Scientists at the Boyce Thompson Arboretum at Superior, Ariz., became interested in the jojoba in the nineteenth century. They pressed oil from the seeds and used it for years to lubricate an office fan. Some of the oil was given to a dentist for use on high-speed instruments where taste of other oils had been objectionable.

Then it was decided to send some seed to the University of Arizona College of Agriculture for chemical analysis. Dr. Robert A. Greene, a chemist at the college, and Elbert O. Foster, a student, began the tests.

Dr. Greene can recall few details of what he did 42 years ago. He is not even sure whether he still has a copy of his research paper. In a telephone interview, he recalled using a hydraulic press to squeeze the oil out of the seeds. He ran a series of standard chemical tests to learn the molecular structure of the oil.

Fats are composed of a molecule of glycerine to which three molecules of fatty acids are attached. Waxes are composed of one molecule of a long-chain alcohol to which a molecule of a fatty acid is attached.

Dr. Greene compared the jojoba oil's chemical structure with other known structures and finally noticed the similarity with the sperm oil. He reported, “The constants of this oil are practically identical with those of sperm oil.”

In the years that followed, other scientists confirmed and refined Dr. Greene's findings. But as long as the supply of sperm oil seemed plentiful, there was no great rush to capitalize on the discovery.

The jojoba attracted many advocates, however. The University of Arizona Office of Arid Lands Studies has begun publishing a periodical called “Jojoba Happenings.” There has been an international scientific conference on the jojoba, and another is planned for next year.

Some advocates, like Dr. Thomas K. Miwa of the Department of Agriculture, are lyrical about the jojoba. “I have looked at it as a noble oil, like liquid gold,” he said.