Kenaf and Flax Find Niche Markets

Kenaf processors continue their search for new markets--promising areas include seeding mats and oil-absorbent materials. Fibers from oilseed and textile flax are used in specialty papers.

The 1993 kenaf harvest has been completed in Louisiana and is underway in California, Mississippi, and Texas. Harvested acreage is estimated at 3,795 (table 6). Yields in Louisiana were down slightly from last year due to low rainfall. Yields in Mississippi will be reduced due to late planting (wet field conditions) and the lack of rainfall during the summer. Yields in Texas and California are expected to be over 7 tons per acre on fields grown for fiber, about the same as last year.

Farmers are fitting kenaf into their local production patterns. In Louisiana, kenaf is planted on some fallow sugar cane land. Generally, sugar cane is planted and then harvested annually for 3 years. The field is left out of production for a year before being replanted. Thus, about a quarter of the land is available at any one time for kenaf and other crops. In 1993, 260 acres of kenaf were harvested in Louisiana. The per-acre planting rate is determined by the need for more bast fiber, which would dictate a higher plant density, or more core material, which would mean a lower density per acre.

In Mississippi and Texas, farmers are producing kenaf in addition to traditional crops, such as cotton, soybeans, corn, and sorghum. In Mississippi, farmers sample their fields for nematodes prior to planting susceptible crops, such as kenaf and cotton. When nematodes are present, farmers are using crop rotations--for example, kenaf following corn or sorghum--to reduce their effect. In California, kenaf is being grown on land that has been used in the past for cotton and sugarbeets. In South Texas, a 5-year experiment with a kenaf-sorghum-cotton rotation is in its last year of study.

In Georgia, 60 acres of kenaf--20 acres in three locations--were planted this year to determine if the crop has potential in the State. At this time, it has not yet been harvested. Plans are also underway to test kenaf to make paper, linerboard, and other products.

Table 6--Kenaf acreage, United States, 1992-93 1/

State	1992	1993	Source of moisture
	--Acres--		
California	560	560	irrigated
Georgia 2/	--	60	N.A.
Louisiana	330	260	rainfall
Mississippi	2,800	2,000	rainfall
New Mexico	50	205	rainfall
Texas	481	650	both
Other 2/3/	40	60	N.A.
Total	4,261	3,795	

N.A. = Not available. – = Not applicable.
1/ Data for 1992 represent harvested acreage. Data for 1993 respresent harvested or projected harvested acreage includina acreage for fiber, seed, and-forage production. 2 /For research.
3/ Arkansas, Florida, and Hawaii.

Kenaf Processors Continue Search for Market Opportunities

During the summer, the Mississippi Delta Fiber Cooperative (Charleston, MS) replaced a major portion of their separation system. Retooling was completed in October, with minor modifications continuing. The facility is operational--processing kenaf into bast fiber for the paper and nonwovens industries and the remaining core material for animal bedding and litter.

Agro-Fibers, Inc. (Angiola, CA), which manufactures and markets lawn-starting and erosion-control mats, is building a mat production facility next to the Mississippi Cooperative. The company received $800,000 from USDA's Alternative Agricultural Research and Commercialization (AARC) Center to install in the Mississippi facility the first manufacturing li'ne devoted solely to kenaf fibers. Commercial production is expected in 1994.

Agro-Fibers now ships bast fibers to a Minnesota mat-manufacturing facility from its fiber-separation plant in California. In Minnesota, grass seeds are embedded in mats of kenaf bast and refined wood fibers. The mats are marketed through garden supply, hardware, and department stores throughout the United States.

The mats are rolled out over lightly prepared soil and watered. The mat stabilizes the seeds until they start growing, usually within 6 to 15 days. As the grass develops, the mat degrades, providing mulch for the newly established lawn. The company also offers a kenaf mat seeded with wildflowers and an unseeded erosion-control mat for use on hillsides and slopes.

K–Mix, Inc., is completing the first phase of their mixing and bagging facility near Kenaf International, Ltd.'s fiber separation facility in LaSara, TX. According to the company, the core material is used in the manufacture of soil-less potting mixes for commercial nurseries.

Kenaf International is developing a strategic plan to establish a kenaf pulp and paper mill complex in South Texas, with the help of a $100,000 repayable cooperative agreement from the AARC Center. The assistance will enable the company to evaluate the project's current economic viability, prepare financing presentations, and execute implementation strategies.

In cooperation with Kenaf International, Gridcore Systems International Corporation (Carlsbad, CA) has carried out tests with Gridcore panels made from kenaf. The company will evaluate the kenaf-based panels for use in stage sets and trade-show displays. Longer term, Gridcore plans to expand portable applications and develop panels for use in the housing and construction industries. The AARC Center is supporting Gridcore's research program with a $50,000 investment. The company is testing different raw materials and manufacturing processes for various construction, arts-and-crafts, and sporting-goods applications.

Kenaf Exhibits Oil Absorption Properties

Harold and Christopher Willett of Natural Fibers of Louisiana, Inc. (Jeanerette, LA) have received notice that their application for a patent using separated kenaf bast fiber and core material for oil absorption from dry or oil-on-water surfaces has been granted. The patent also defines the method of action--the fiber attracts and holds the oil by adhesion while the core absorbs the oil.

Both natural and synthetic fibers can be used for oil absorption. The best materials have surfaces that attract oil and repel water. Natural fibers with wax-like compounds on their surface possess these properties. The porous, sponge-like nature of a material is also important for oil absorption. Kenaf, cotton, milkweed floss, and peat moss meet both these criteria (2).

Inorganic materials, mostly clays, and manufactured synthetic fabrics, predominantly polypropylene mats, have been the main types of sorbents used. Recently, however, natural organic materials have made inroads in specific markets. Several reasons are cited for such a shift, including the following:

- They are biodegradable, which means the used product could be disposed of in a compost facility if the spilled/absorbed liquid could legally be discarded in such a manner.
- They are mostly renewable resources, such as wool, corn cobs, wood byproducts. Peat moss, however, is mined from bogs.
- They have lower per-unit costs than the polypropylene fabrics.
- They have less of an impact on the environment if released or lost during spill clean-up operations.
- They are perceived as environmentally friendly by the public *(1)*.

USDA's Cooperative State Research Service, Office of Agricultural Materials, in collaboration with the Department of Defense, is funding research at the University of Pittsburgh to compare the characteristics of organic oil absorbents and at the University of Houston to develop further uses of organic absorbents such as kenaf. USDA's Agricultural Research Service **(ARS)** is working with several universities on kenaf product research. Scientists at Mississippi and Louisiana State Universities are investigating chemical methods to process kenaf into a superior grade fiber for nonwoven applications. Kenaf, in combination with peat moss and/or vermiculite, has shown promise as a horticultural growth medium in tests at Mississippi State University and the University of Delaware. In addition, scientists at USDA's Forest Products Laboratory are developing resin composites based on kenaf and researchers at ARS's Southern Regional Research Center are examining various methods of forming nonwovens made from kenaf.

Flax Fibers Are Used in Specialty Papers

It is estimated that about 250,000 tons of nonwood fiber pulp is produced annually in the United States for use in paper, paperboard, and insulating board. According to Joseph E. Atchison, an expert in the use of nonwood fibers for paper production, these include pulp for specialty papers, such as staple cotton fiber for currency, cotton linters for high-quality letterhead paper, flax straw for cigarette paper, bagasse for insulating board, and abaca (manila hemp) and other specialty fiber pulps for tea bags, filter papers, and sausage casings.

In the United States, flax is the most extensively used nonwood fiber employed in papermaking, except for cotton. Because of its long slender fibers, flax pulp is ideal for the production of thin strong papers, such as cigarette, airmail, bible, and light-weight bond papers.

Two types of flax are grown throughout the world--fiber varieties for the long linen fibers and oilseed varieties for linseed oil and meal. The shorter fiber strands that are a byproduct of processing raw textile flax are known as flax tow. The plant material left in the field after oilseed varieties have been harvested is known as seed flax straw.

Oilseed flax is grown in North and South Dakota, Minnesota, and the prairie provinces of Canada. Two U.S. manufacturers--Ecusta Division of P.H. Glatfelter Company (Pisgah Forest, NC) and the Specialty Division of the Kimberly Clark Corporation (Spotswood, NJ)--buy baled flax straw that farmers deliver to portable decorticating rigs. The straw is processed, separating the long outer fibers from the inner core of the stem. The resulting fiber, called seed flax tow, is then shipped to the two paper mills. At this time, a majority of seed flax tow comes from Canada.

Seed flax tow is used as the main ingredient in cigarette paper pulp. According to Frank Riccio of Danforth International

Trade Associates (Point Pleasant, NJ), more than 50,000 tons of seed flax tow are used annually in the North American market. In addition, flax tow and waste are imported to enhance the quality of the cigarette paper pulp. Such imports are estimated to average 7,000 to 10,000 tons per year. The use of flax in cigarette paper may be declining, however. Recent trends indicate that cigarette companies may be moving away from flax-based paper to wood-based paper because it is less expensive.

Noils, a byproduct of linen spinning, is also imported for currency paper. Standard U.S. currency is 80 percent cotton and 20 percent flax. Riccio estimates that about 6,000 tons are imported per year. Most of the high quality flax fiber and yam imported into this country is shipped to spinners and weavers. Upholstery and draperies are the major uses of the resulting linen fabric. Lewrene Glaser (202) 219-0085]

1. Schrader, Edward L. "A Practical Comparison of Organic, Synthetic, and Inorganic Sorbents." Paper presented at Clean Gulf '93 and the American Chemical Society: Emerging Technology in Hazardous Waste Management.

2. Tiler, Frank M. Department of Chemical Engineering, University of Houston.