

The onward march of eucalyptus

Demand for this versatile hardwood pulp is growing



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Global demand for bleached eucalyptus market pulp (BEKP) has steadily increased from 2 million tons in 1980 to 10 million tons in 2005. The annual average growth of 7.4% has been higher than that of other hardwoods at 2.8% and softwood pulp at 3.2% over the same period. Bleached eucalyptus kraft pulp represents just under 50% of the world hardwood pulp produced and more than 20% of the total chemical pulp market.

Latin America is the dominant region for eucalyptus pulp production (Figure 1).

The largest producer is Aracruz Celulose based in Brazil (Table 1). In 2007 the company produced 2,569,000 tons of bleached eucalyptus kraft pulp and accounted for 24% of the global supply of the product. [Editor's note: On Aug. 6, 2008, Brazil's Votorantim Celulose e Papel (VCP) said it would increase its stake in Aracruz Celulose for 2.71 billion

reais (US\$1.7 billion) as part of a plan to merge the two companies.]

A PULP FOR OUR TIME

Aside from the production economics of eucalyptus vs. northern hardwoods, eucalyptus pulps have attractive properties—good wet and dry strengths and very high bulk and opacity. These properties are important for the “lightweighting” of printing and office grades since they enable maintenance of bulk, stiffness and opacity at lower basis weights. Even at standard basis weights, higher opacity levels offer scope for some reduction in

expensive opacifiers. Eucalyptus pulps also give good surface uniformity and formation. However, switching from northern hardwoods to eucalyptus pulps will involve some adjustment to stock preparation, especially refining; sheet forming, drainage and possibly wet-end chemistry; and wet pressing.

Users of easily-refined birch pulps will find that eucalyptus is harder to refine but gives better properties. The eucalypts will tend to develop better

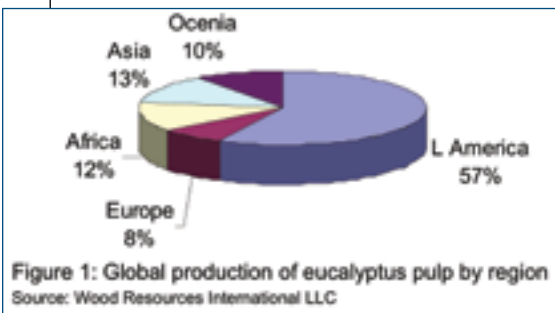
Country	Company	Output
Brazil	Aracruz	2,569,000 tons
Brazil	Votorantim Celulose e Papel	1,394,370 tons
Brazil	Suzano	1,100,000 tons
Brazil	Celulose Nipo-Brasileira	940,000 tonnes
Brazil	Jari	356,000 tonnes
Portugal	Portucel	1,300,000 tonnes
Chile	CMPC Papeles	1,140,000 tonnes
Spain/Uruguay	Ence	+1,000,000 tonnes
Uruguay	Oy Metsä-Botnia Ab	1,000,000 tonnes

Source: Compiled by Pira

Table 1: Key eucalyptus producers

wet and dry strength than northeast or southern U.S. hardwood pulps. Optimization will require some experimentation with refining fillings, e.g. finer bar patterns, to get the best from the pulp. The ratio of specific edge load to total energy input is crucial. Hardwoods in general, and eucalypts in particular, develop properties at lower refining intensities in relation to total energy input.

The flow properties, flocculation rate and drainage characteristics of eucalypt fiber suspensions differ from other hardwoods and require adjustments to chemical addition points, retention systems and the wire drainage elements—more a case of fine-tuning than capital expenditure. The development of bulk may require optimization of the press section, including possible changes



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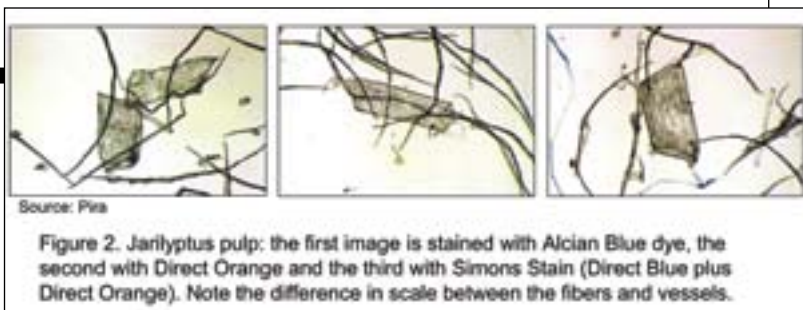
to the felt design to reduce nip intensity. Press operations suited to non-eucalypt pulps may not give the best results with eucalypts.

It follows that some existing paper machines will work better with eucalypts than others. Also, the properties of pulps will depend upon the predominant tree species from which they are produced.

PROBLEMS WITH VESSELS

Vessels are the remnants of the “water pipes” that penetrate the tree tissues and are common to all hardwoods. By their nature they are tougher and less permeable than fibers (Figure 2).

Eucalyptus and also oak species have wide vessels that collapse in pulping to produce flat rectangular particles that are wider than the fibers and



do not easily bond to them. If there is a sufficient occurrence of vessels at the paper surface, “hickies” appear at the offset litho press. ☹

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For further information about dealing with vessels in hardwoods, see “Accurate Vessel Measurement Improves Runnability of High End Papers,” by Wätzig and Weihs, *Paper360*°, August 2008, page 34.

“Mr. Eucalyptus”: Brazilian fiber expert Celso Foelkel

Celso Foelkel, managing director of Celsulo Degree Ltd., Brazil, notes that last year’s global production of bleached eucalyptus market pulp (BEKP) reached 13.79 million metric tons, or 53.3% of the world’s total hardwood kraft production. Some 7.81 million metric tons of that, or 30% of the global hardwood kraft output, was in Brazil.

The globalization of eucalyptus as a papermaking fiber has increased as refining technologies have improved, Foelkel explains. Today, eucalyptus fiber is being used around the world in a broadening array of commodity and specialty papers and wood products.

In North America, tissue producers are using more eucalyptus because of the softness and sensation of smoothness it imparts to these products, Foelkel continues. Also, some cut-size copy papers and other P&W grades are now being made with 100% eucalyptus fiber, which gives a very smooth surface that reduces ink consumption. “In ink jet printers, this is especially important since it makes expensive ink cartridges last much longer,” Foelkel says.

Foelkel believes that genetically improved, cold-resistant species of eucalyptus now being developed will soon lead to increased growth in North America and Europe. He adds that genome mapping work under way at Oak Ridge National Labs in the U.S., together with other labs around the world, will likely produce more freeze-resistant eucalyptus, possibly opening the door to future plantation growth in North America. Also, global

warming could extend eucalyptus growth zones further north in coming years, he adds.

Eucalyptus plantation development in Brazil and throughout South America is still expanding, Foelkel explains, noting that all capacity there is currently captive or “spoken for.” With more mills under construction or being planned, Eucalyptus demand continues to grow rapidly, which is driving forest companies and farmers to plant more and more.

In Brazil, there are currently some 3.7 million hectares of existing plantation eucalyptus (plus 1.8 million hectares of pine plantations) and some 500,000 new hectares of eucalyptus are being planted yearly. Altogether, Brazil has about 5.5 million hectares in its plantation system, which represents only about 0.7% of the land mass in that country. “Which means we have a lot of space left to grow eucalyptus,” Foelkel points out. Some 85% of the plantation systems in Brazil are owned by the forest companies.

In regard to the increasing use of woody biomass as a boiler fuel to reduce carbon dioxide emissions, Foelkel does not foresee this leading to considerably higher fiber prices and reduced availability in Brazil or South America.

“Companies here are still making some very big investments in pulp and paper mills. They will protect these investments by resisting any significant usage of plantation fiber as biomass fuels,” he says, adding, however, that biofuels and bioenergy will definitely become key new product areas for the industry there.

—Ken Patrick

