

PEAT

By Stephen M. Jasinski

Domestic survey data and tables were prepared by Jeff Milanovich, statistical assistant, and the world production table was prepared by Regina R. Coleman, international data coordinator.

Peat is a renewable, natural, organic material of botanical origin and of commercial significance. Peatlands are situated predominately in shallow wetland areas of the Northern Hemisphere, where large deposits developed from the gradual decomposition of plant matter under anaerobic conditions.

Peat has widespread use as a plant-growth medium in a variety of horticultural and agricultural applications, where its fibrous structure and porosity promote a unique combination of water-retention and drainage characteristics. Commercial applications include potting soils, lawn and garden soil amendments, and turf maintenance on golf courses. In industry, peat is used primarily as a filtration medium to remove toxic materials from process waste streams, pathogens from sewage effluents, and deleterious materials suspended in municipal storm-drain water. In its dehydrated form, peat is a highly effective absorbent for fuel and oil spills on land and water.

The United States remained a significant producer and consumer of peat for horticultural, agricultural, and industrial purposes. A variety of peat types were extracted and processed from 61 identified operations in 17 of the conterminous United States and by several companies in Alaska. The grades of peat included, in order of importance, reed-sedge, sphagnum moss, hypnum moss, and humus. Florida, Michigan, and Minnesota accounted for 78% of U.S. production. The United States imported one-half of its total domestic requirements, principally from Canada, where deposits of high-quality sphagnum moss are extensive.

U.S. production and sales of peat increased for the fifth

consecutive year (table 1). Imports of sphagnum peat from Canada increased by 5%.

Production

Domestic production data for peat were developed from a voluntary survey of operations in the conterminous United States by the U.S. Geological Survey (USGS). Of the 64 operations to which a survey request was sent, 46 responded, representing 75% of total production. Peat production in 2000 was 755,000 metric tons (t), a 3% increase from that of 1999 (table 2).

Geographically, domestic production was dominated by operations in Florida, Michigan, and Minnesota (table 3). Reed-sedge peat accounted for 80.5% of production by weight, followed by hypnum moss, 7.2%; sphagnum moss, 6.4%; and humus, 5.9% (table 4). Peat production in Alaska was estimated to be 30,600 cubic meters in 2000, according to the Alaska Department of Natural Resources (Szumigala and Swainbank, 2001, p. 12), which conducted its own survey of mineral production in the State. Only volume of production was reported.

Consumption

Sales of domestic peat increased by 2% to 847,000 t compared with that of 1999. Packaged products composed 43% of total domestic sales tonnage and commanded premium prices

Peat in the 20th Century

Domestic commercial production of peat was first recorded in 1904, although peat had been used as fuel in New England since the colonial era and was still harvested for local or individual use. By 1908, commercial production of peat had grown to nearly 23,000 metric tons from less than 1,000 tons in 1904. The largest use was as a filler material in chemical fertilizers. Dried, ground peat was added to the fertilizer product to provide nitrogen and improve the consistency and water holding capability. Peat also was used for stable litter and was combined with molasses residue for use as stock feed. Early in the century, considerable interest was given to using peat as a fuel source, especially after a strike by anthracite coal miners in 1902 to 1903. Some small peat powerplants did operate intermittently throughout the century, but abundant U.S. resources of wood, coal, oil, and natural gas made it difficult for peat to be a cost-effective fuel source. Peat was harvested by draining the bog, plowing the peat, and forming it into windrows to air dry. When the peat had dried

to about 50% moisture, it was transported to a mechanical dryer, which lowered the moisture content to 10%. It was then screened to remove waste matter and sold. At the end of the century, peat was harvested by the same basic methods; such specialized machinery as the pneumatic harvester, however, greatly improved efficiency. From about 1930 to 2000, peat had been used primarily as a soil conditioner in such applications as golf course improvement, potting soil mixes, general nursery use, and vegetable growing.

In 2000, the United States produced 755,000 tons of peat and imported 786,000 tons, mostly from Canada. Consumption grew steadily in the 1990s as horticultural business benefited from demand generated by new construction of houses, commercial buildings, golf courses, and recreational facilities. The total sales value of domestic peat in 2000 was \$22.7 million, and imports were valued at \$157 million. World production was estimated to have been about 27 million metric tons, with more than one-half used as fuel.

for all grades except humus. Apparent consumption decreased by 5% from that of 1999. General soil improvement and potting soil mixes were the two largest usage categories, accounting for 82% of domestic sales. Other significant uses included mixed fertilizers, nursery applications, golf course applications, and seed inoculants. Imports of sphagnum moss from Canada accounted for nearly 50% of U.S. consumption. Canadian peat was sold in bulk for blending in soil mixes and packaged for horticultural use.

Scotts Co. purchased the worldwide distribution rights for horticultural peat and peat products manufactured by Bord na Móna plc of Ireland. Scotts will market the products under the Shamrock® brand, which it had acquired from Bord na Móna in 1998 for distribution in Ireland and the United Kingdom. Currently [2000], the products are marketed to professional growers but will be expanded to the consumer market in the future (Scotts Co., 2000).

Stocks

U.S. yearend stocks of peat increased by 3% to 279,000 t (table 4). Reed-sedge peat accounted for 92% of total stocks, followed by humus, sphagnum moss, and hypnum moss.

Prices

The total reported free on board (f.o.b.) value for domestic peat sold in the United States was \$22.7 million according to the annual survey of domestic peat producers conducted by the USGS. The average unit value increased to \$26.85 per metric ton compared with \$26.48 per ton in 1999. Packaged peat sold for a higher value for all grades except humus. On a unit-value basis, packaged sphagnum moss was valued at \$68.42 per ton, f.o.b. plant; hypnum moss, \$52.47 per ton; reed-sedge, \$24.33; and humus, \$17.86 per ton (table 7).

Foreign Trade

Imports of peat increased by 3% to 786,000 t in 2000 (table 8). The total customs import value was \$157 million or \$199.65 per ton. Imports of sphagnum moss from Canada increased to 783,000 t, which represented 64% of total Canadian production. The United States exported 37,000 t of peat.

World Review

World production decreased to 27.4 million metric tons (Mt) in 2000 compared with 29.5 Mt in 1999. According to information available to the USGS, 22 countries reported peat production (table 9). Production was dominated, in order of importance, by Finland, Ireland, Germany, Belarus, Russia, and Canada. Other significant producing countries included Sweden, Estonia, the United States, and Latvia. Peat is an important source of energy in Ireland, Scandinavia, and the former Soviet Union (FSU). In 2000, at least 14.7 Mt of reported world production was for fuel use. Most of the unspecified uses were

believed to have been for horticultural use; however, information was not available to make an accurate estimate.

Estimated production from countries of the FSU accounted for a significant portion of global peat production, although output from the region has decreased since 1990. Political restructuring, the reduced use of peat as a fuel, and unfavorable economic trends were all believed to have been major factors responsible for the drop in production.

In Canada, production of sphagnum moss decreased by 7% to 1.23 Mt (table 9). New Brunswick, Quebec, and Alberta were the major producing provinces, in order of importance (Natural Resources Canada, 2000, Preliminary estimate of the mineral production of Canada, by province—2000, accessed July 27, 2001, at URL <http://www.nrcan.gc.ca/mms/efab/mmsd/production/2000.pdf>). Exports to the United States increased to 783,000 t.

Outlook

The outlook for horticulture and associated business is bright because global demand for plants, flowers, ornamental trees, natural turf, and outdoor recreational activities continues to grow at a substantial rate. The outlook for the domestic peat industry, therefore, will likely be governed by several variables, including future wetlands environmental regulations, the ability to permit new bogs, growth and competition from recycled yard wastes and other natural organic materials, Canadian competition, and the degree of market penetration by flowers and ornamental plants from abroad.

References Cited

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Szumigala, D.J., and Swainbank, R.C., 2001, Alaska's mineral industry 2000—A summary: Fairbanks, AK, Alaska Department of Natural Resources Information Circular 47, 15 p.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

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Peat. Ch. in Minerals Yearbook, annual.
Peat. Ch. in United States Mineral Resources, Professional Paper 820, 1973.

Other

- Lappalainen, Eino, ed., 1996, Global peat resources: Jyväskylä, Finland, International Peat Society, 360 p.
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TABLE 1
SALIENT PEAT STATISTICS 1/

(Thousand metric tons, unless otherwise specified)

	1996	1997	1998	1999	2000
United States: 2/					
Number of active producers	59	56	60	58	61
Production	549	661	685	731	755
Sales by producers	640	753	791	834	847
Bulk	325	432	399	444	483
Package	314	320	392	390	364
Value of sales thousands	\$18,500	\$17,500	\$19,200	\$22,100	\$22,700
Average per metric ton	\$28.90	\$23.23	\$24.26	\$26.48	\$26.85
Average per metric ton, bulk	\$23.90	\$21.65	\$24.98	\$25.83	\$23.45
Average per metric ton, packaged or baled	\$34.00	\$25.34	\$23.52	\$27.23	\$31.36
Exports	19	22	30	40	37
Imports for consumption	667	754	761	752	786
Consumption, apparent 3/	1,240	1,310	1,430	1,580	1,500
Stocks, December 31, producers'	342	421	408	272	279
World production	29,300 r/	30,200 r/	18,700 r/	29,500 r/	27,400 e/

e/ Estimated. r/ Revised.

1/ Data are rounded to no more than three significant digits, except average values per metric ton.

2/ Exclusive of Alaska.

3/ Apparent consumption equals U.S. production plus imports minus exports plus adjustments for industry stock changes.

TABLE 2
RELATIVE SIZE OF PEAT OPERATIONS IN THE UNITED STATES

Size (metric tons per year)	Active operations		Production (thousand metric tons)	
	1999	2000	1999	2000
23,000 and over	10	9	563	559
9,000 to 22,999	3	5	46	67
5,000 to 8,999	12	10	77	72
2,000 to 4,999	9	11	32	41
1,000 to 1,999	6	6	9	10
Under 1,000	18	20	4	6
Total	58	61	731	755

TABLE 3
U.S. PEAT PRODUCTION AND SALES BY PRODUCERS IN 2000, BY STATE 1/

Region and State	Active oper- ations	Production, (thousand metric tons)	Sales		
			Quantity (thousand metric tons)	Value 2/ (thousands)	Percent packaged
East:					
Florida	8	379	416	\$8,640	9
Pennsylvania	4	7	6	183	35
Other 3/	7	24	30	1,010	38
Total or average	19	410	453	9,830	11
Great Lakes:					
Michigan	10	189	207	5,750	88
Minnesota	12	64	75	5,100	61
Other 4/	13	76	98	1,790	86
Total or average	35	330	380	12,600	82
West 5/	7	15	14	264	4
Grand total or average	61	755	847	22,700	43

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Values for f.o.b. producing plant.

3/ Includes Maine, New Jersey, New York, North Carolina, and West Virginia.

4/ Includes Illinois, Indiana, Ohio, and Wisconsin.

5/ Includes Iowa, Montana, and Washington.

TABLE 4
U.S. PEAT PRODUCTION AND PRODUCERS' YEAREND STOCKS IN 2000, BY TYPE

Type	Active operations	Production 1/ (metric tons)	Percent of production	Yearend stocks 1/ (metric tons)
Sphagnum moss	9	48,000	6.4	2,760
Hypnum moss	9	54,500	7.2	1,630
Reed-sedge	30	607,000	80.5	256,000
Humus	15	44,800	5.9	19,200
Total	61 2/	755,000	100.0	279,000

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Some plants produce multiple types of peat; may not add to totals shown.

TABLE 5
U.S. PEAT SALES BY PRODUCERS IN 2000, BY TYPE AND USE 1/

Use	Sphagnum moss			Hypnum moss			Reed-sedge		
	Quantity			Quantity			Quantity		
	Weight (metric tons)	Volume 2/ (cubic meters)	Value (thou- sands)	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)
Earthworm culture medium	19	116	\$2	--	--	--	466	719	\$9
General soil improvement	40,000	214,000	2,870	10,800	17,700	\$557	332,000	580,000	6,540
Golf courses	7,790	36,600	586	1,230	2,290	30	13,800	37,500	2,140
Ingredient for potting soils	1,710	7,190	75	48,500	77,200	1,480	244,000	410,000	4,720
Mixed fertilizers	5,920	22,900	344	--	--	--	22,700	38,200	475
Mushroom beds	--	--	--	--	--	--	--	--	--
Nurseries	1,830	9,670	96	5,900	10,700	144	46,500	77,500	996
Packing flowers, plants, shrubs, etc.	13,100	91,700	624	454	765	11	21	38	1
Seed inoculant	64	395	6	4,540	7,650	120	8,710	8,410	114
Vegetable growing	--	--	--	1,230	2,290	30	2,270	3,820	48
Other	115	485	2	--	--	--	1,070	1,530	14
Total	70,500	383,000	4,610	72,600	119,000	2,380	671,000	1,160,000	15,100
	Humus			Total					
	Quantity			Quantity					
	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)	Weight (metric tons)	Volume (cubic meters)	Value (thou- sands)			
Earthworm culture medium	1,070	1,640	\$18	1,550	2,480	\$30			
General soil improvement	5,950	8,710	125	389,000	820,000	10,100			
Golf courses	272	382	3	23,100	76,800	2,760			
Ingredient for potting soils	11,700	11,400	189	306,000	506,000	6,460			
Mixed fertilizers	860	1,040	21	29,500	62,100	839			
Mushroom beds	181	141	10	181	141	10			
Nurseries	1,380	1,850	32	55,600	99,700	1,270			
Packing flowers, plants, shrubs, etc.	2,020	3,060	33	15,600	95,600	669			
Seed inoculant	--	--	--	13,300	16,500	240			
Vegetable growing	1,080	1,570	22	4,580	7,680	100			
Other	7,920	9,980	241	9,110	12,000	258			
Total	32,500	39,800	694	847,000	1,700,000	22,700			

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Volume of nearly all sphagnum moss was measured after compaction and packaging.

TABLE 6
AVERAGE DENSITY OF DOMESTIC PEAT SOLD IN 2000 1/

(Kilograms per cubic meter)

	Sphagnum moss	Hypnum moss	Reed- sedge	Humus
Bulk	235	612	597	733
Package	173	617	558	970
Bulk and package	184	613	579	817

1/ To convert kilograms per cubic meter to pounds per cubic yard multiply by 1.685.

TABLE 7
PRICES FOR PEAT IN 2000 1/

(Dollars per unit)

	Sphagnum moss	Hypnum moss	Reed- sedge	Humus	Average
Domestic:					
Bulk:					
Per metric ton	55.21	29.76	21.02	23.90	23.45
Per cubic meter	12.98	18.21	12.54	17.52	13.42
Packaged or baled:					
Per metric ton	68.42	52.47	24.33	17.86	31.36
Per cubic meter	11.82	32.37	13.57	17.33	13.33
Average:					
Per metric ton	65.33	32.71	22.43	21.37	26.85
Per cubic meter	12.03	20.04	13.00	17.45	13.38
Imported, total, per metric ton 2/	XX	XX	XX	XX	199.65

XX Not applicable.

1/ Prices are f.o.b. plant.

2/ Average customs value.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF PEAT MOSS, BY COUNTRY 1/

Country	1999		2000	
	Quantity (metric tons)	Value 2/ (thousands)	Quantity (metric tons)	Value 2/ (thousands)
Canada	750,000	\$149,000	783,000	\$156,000
Denmark	575	152	1,710	512
Finland	284	38	153	41
Ireland	543	71	651	109
Latvia	--	--	518	127
Netherlands	125	89	81	26
Sri Lanka	145	30	--	--
Other 3/	116	151	123	131
Total	752,000	149,000	786,000	157,000

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Customs value.

3/ Includes Chile, China (2000), France (2000), Germany, New Zealand, Norway (1999), and Taiwan.

Source: U.S. Census Bureau.

TABLE 9
PEAT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1996	1997	1998	1999 e/	2000 e/
Australia e/	15	15	15	15	3
Belarus:					
Horticultural use	533	253	99	100	100
Fuel use	2,847	2,768	2,035	2,000	2,000
Total	3,480 r/	3,021 r/	2,134 r/	2,100 r/	2,100
Burundi	10	10 r/	10 r/	17 r/ 4/	15
Canada, horticultural use	901	1,054	1,132	1,321 r/ 4/	1,229 4/
Denmark, horticultural use e/	204 4/	205	205	200	200
Estonia, horticultural and fuel use	1,100 r/	1,002 r/	365	923	1,000
Finland: e/					
Horticultural use	300 r/	600 r/	150 r/	800 r/	400
Fuel use	7,000 r/	9,500 r/	1,700 r/	8,000 r/	7,000
Total	7,300 r/	10,100 r/	1,850 r/	8,800 r/	7,400
France, horticultural use e/	200	200	200	200	200
Germany: e/					
Horticultural use	2,800	2,800	2,800	2,800	2,800
Fuel use	180	180	180	180	180
Total	2,980	2,980	2,980	2,980	2,980
Hungary, horticultural use e/	45	45	45	45	45
Ireland:					
Horticultural use e/	400 r/	400 r/	400 r/	350 r/	400
Fuel use	6,578	3,851	4,000 r/ e/	5,300	5,100
Total	6,978 r/	4,251	4,400 r/ e/	5,650 r/	5,500
Latvia, horticultural and fuel use	552	555 r/	172	683 4/	650
Lithuania, horticultural and fuel use	250 e/	295	202 r/	380 r/ 4/	350
Moldova e/ 5/	463 4/	475	475	475	475
Norway, horticultural use e/	30	30	30	30	30
Poland, horticultural and fuel use	198	206	213 r/	200	200
Russia 5/	1,500 r/	2,100 r/	1,700	2,000	2,000
Spain e/	60	60	60	50	50
Sweden: e/					
Horticultural use	300	350	200	440 r/	300
Fuel use	700	1,000	120	800	400
Total	1,000	1,350	320	1,240 r/	700
Ukraine e/ 5/	1,000	1,000	1,000	1,000	1,000
United Kingdom e/	550	550	500	500	500
United States, horticultural use	549	661	685	731	755 4/
Grand total	29,300 r/	30,200 r/	18,700 r/	29,500 r/	27,400
Of which:					
Horticultural use	6,260 r/	6,600 r/	5,950 r/	7,020 r/	6,460
Fuel use	17,300 r/	17,300 r/	8,040 r/	16,300 r/	14,700
Unspecified	5,700 r/	6,270 r/	4,710 r/	6,240 r/	6,240

e/ Estimated. r/ Revised.

1/ World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes data available through June 25, 2001.

3/ In addition to the countries listed, Austria, Iceland, and Italy produced negligible amounts of peat.

4/ Reported figure.

5/ Production appears to be for fuel use.