PEAT

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Peat is a renewable, natural organic material of botanical origin and commercial significance that is deposited over more than 4% of the Earth's surface, where it plays an active role in the dynamics of our planet's ecosystem. Commercial peatlands are situated predominately in shallow wetlands areas of the northern hemisphere, where large deposits developed from the gradual decomposition of plant matter under anaerobic, or oxygen free, 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, along with an affinity for plant available mineral nutrients. 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 mine and process waste streams, pathogens from sewage effluents, and deleterious materials suspended in municipal storm drain water. In its dehydrated form, peat becomes hydrophobic and is a highly effective absorbent for fuel and oil spills on both land and water.

In 1995, the United States continued as a significant producer and consumer of peat for horticultural, agricultural, and industrial purposes. A variety of peat types was extracted and processed from 64 identified operations in 20 of the lower 48 States, and Alaska, including reed-sedge, sphagnum moss, humus, and hypnum moss, in order of importance. Over 85% of U.S. peat production came from the Southeast and Great Lakes States, where Florida, Michigan, and Minnesota ranked as the dominant producers, in order of importance. The United States imported over 60% of its total domestic peat requirements, principally from Canada, where there were extensive deposits of sphagnum peat moss. Only a small amount of peat was exported. *(See figure 1.)*

U.S. peat production and sales rose in 1995, but still continued the long term downward spiral since 1987, according to data reported to the U.S. Bureau of Mines and the U.S. Geological Survey (USGS) by domestic producers. Record high imports of Canadian sphagnum remained the same in 1995 and the apparent domestic consumption slipped 11% to 1.1 million metric tons. The U.S. peat industry continued to be affected by stringent wetlands legislation at the Federal and State levels in recent years, that has hampered the permitting of new bogs for replacement or expansion. Several producers were integrating compost into their product lines to absorb a wealth of renewable organic material generated by the nation's efforts to recycle yard waste.

Production

Peat production in the United States increased just 2% between 1994 and 1995, according to the USGS annual survey of domestic peat producers. The long-term trend of declining U.S. peat production, a concomitant drop in the number of domestic operations, decreasing domestic consumption, and the capture of an increasing market share by Canadian sphagnum peat moss producers shipping to the United States continued. *(See table 1.)*

Geographically, domestic production was dominated by several operations in the Great Lakes region, and the Southeast, where Florida, Michigan, and Minnesota were the dominant producers, in order of importance, according to information reported to the USGS by the industry. Approximately 15% of U.S. production was from operations in the Northeast and Western States. In 1995, large operations—23,000 tons and above—accounted for 69% of total U.S. production. Reed-sedge peat accounted for about 70% of domestic production by weight; sphagnum moss, 13%; humus, 12%; and hypnum moss, 5%. *(See tables 2, 3, and 4.)*

Consumption

Domestic peat sales volume reversed the downward trend by increasing 20% in 1995 amounting to 660,000 tons, or 60% of total U.S. apparent domestic consumption. Packaged materials were 49% of total domestic sales tonnage and commanded premium prices, $29.24 per metric ton, totaling $17 million in 1995. Canadian imports reached a record high 667,000 tons, and accounted for 61% of total U.S. apparent domestic consumption. Ireland and several other countries, principally in Scandinavia, shipped minor tonnages that accounted for less than 1% of total U.S. peat demand. Domestic peat sales, by weight, followed the same relative distribution trend as production, led by reed-sedge, sphagnum moss, humus, and hypnum moss, in order of importance. High quality sphagnum peat moss ranked second to reed-sedge on a volume basis, because of its high fiber and low density characteristics. Thus, reed-sedge sales were 70% of the total, by volume; sphagnum moss, 13%; humus, 12%; and hypnum moss, 5%.

In 1995, almost 55% of domestic peat was sold for use in general soil improvement, followed by potting soils, 28%; the nursery business, 10%; mixed fertilizers, golf course maintenance and seed inoculant making up the rest. The remainder was used in a variety of applications, including vegetable cultivation, packing for flowers and plants, earthworm culture, and in the industrial sector. *(See tables 3, 5, and 6.)*

Stocks

U.S. peat stocks rose 52% to 384,000 tons in 1995. Reed-sedge peat was 63% of the total; sphagnum, 26%; humus, 10%; with hypnum moss and other forms accounting for the remainder. *(See table 4.)*

Prices

The total f.o.b. plant value of domestic peat sold in the United States in 1995 rose 11% to $17 million, according to the USGS annual survey of domestic peat producers. Although the total value of domestic peat rose relative to 1994, owing to an increase in sales volume, the average unit value fell 5% to $25.80 per ton from $27.22 in 1994. The total wholesale value of the U.S. peat supply in 1995, including imported material, fell 2% to $138 million, compared with $141 million in 1994.

Reed-sedge peat was valued at $10.8 million, f.o.b. plant, rising 19% from 1994, and accounted for 64% of total domestic product sales value; followed by sphagnum moss, $4.1 million, 24%; humus, $1.1 million, 6%; and hypnum moss, $1.0 million, or 6% of total. On a unit value basis, packaged sphagnum moss was valued at near $95.55 per ton, f.o.b plant; hypnum moss, $69.71 per ton; reed-sedge, $18.56 per ton; and humus, $15.66 per ton. *(See tables 1, 3, 5, 7, and 8.)*

Foreign Trade

The United States continued to export minor tonnages of peat, which amounted to 23,000 tons in 1995, the same as in 1994. U.S. produced peat was valued at $2.2 million, or about $95 per ton, free-along-side-ship. U.S. peat exports were primarily directed to Latin American countries.

Canadian sphagnum moss import volume reached a record high of 667,000 tons in 1995, and carried a customs value of $121 million or $182 per ton. This was $7 per ton or 3% lower than the comparable unit value in 1994. Imports from Ireland rose 72% to 1,030 tons in 1995, and carried a customs value of $88,000 or about $85 per ton. Ireland's Shamrock Peat brand was selected as the material of choice for greens reconstruction at the Atlanta Athletic Club golf course in Georgia. Seven countries, including Denmark, Finland, and Norway in Scandinavia; Germany and the Netherlands in Western Europe; together with New Zealand and Sri Lanka; shipped only 617 tons, dropping 82% from that of 1994, that carried a customs value of $293,000 or $475 per ton, rising 69% over that of 1994. *(See table 8.)*

World Review

Twenty-two countries were known to produce peat in 1995, according to information available to the USGS. Russia was estimated to account for about 47% of global peat production, although a continuing decline was believed to have occurred owing to political restructuring and unfavorable economic trends. The Ukraine and Belarus Republics followed Russia in order of importance. The Baltic Republics of Estonia, Latvia, and Lithuania also produced significant quantities of peat. *(See table 9.)*

Peat production outside the former Soviet Union was dominated by Ireland, Finland, Germany, Sweden, and Canada, in order of importance, which, in combination, accounted for 14% of global production. The remainder was produced principally by the United States, with minor contributions from countries in Africa, Eastern Europe, Latin America, Western Europe, and Oceania. *(See table 9.)*

Belarus.—A new Republic, part of the former U.S.S.R., now independent was the fourth largest Republic of the former State. In 1995, Belarus consumed about 1.3 million tons of fuel peat by the population of 2.5 million people. At least 20 concerns were listed in the Belarus directory as peat and peat briquete producers. The largest peat factory, called "Sergeevichskoe," is in the Minsk District, employing over 600 people. The City of Minsk is the capital of the Republic. The employment, the operating cost, and products produced are listed for all companies, however, the production volume was given for only six companies. The largest producer of peat by volume was listed in the Brest District, West of Pinsk Marsh, with 75,500 tons of peat and briquetes per year, with about 280 employees. The Belarus soil is composed primarily of sand and with many marshes and swamps, thus giving rise to many peat deposits.[1]

Canada.—Natural Resources Canada reported that Canadian peat production reached a new record high of 1 million tons in 1995. The Quebec Province was the largest producer, with over 365,000 tons. New Brunswick Province was the second largest, producing about 340,000 tons. The eastern Provinces of New Brunswick and Quebec accounted for 70% of the total, while Alberta, Manitoba, and Saskatchewan in western and central Canada, and Newfoundland, Nova Scotia in the east supplied the remainder. In 1995, Canada exported 667,000 tons of peat to the United States, mostly sphagnum moss destined for horticultural use, valued at $121 million.[2]

Ireland.—In 1995, peat production in Ireland remained about the same as in 1994, amounting to about 6.85 million tons. Of that, 365,000 tons of briquetes was included for fuel use. Ireland exported to the United States 1,030 tons of peat moss, a large increase of about 70% from that of 1994. *(See table 8.)*[3]

Current Research and Technology

Researchers at the Natural Resources Research Institute (NRRI), University of Minnesota at Duluth, were testing peat sorbents for removing hydrocarbons from land and water. Peat Technologies Inc. (PTI) developed a peat product called MultiSorb™ for that purpose. PTI manufactures peat granules for the extraction of metal and organic contaminants from wastewaters. That product can be applied to remove heavy metals such as cadmium, lead, and mercury. Japan and South Africa are considered as potential future users of that product.[4]

NRRI and its community are also investigating the

application of granulated peat filters to clean up sewage and raw effluents for lakeshore residents. The project covers research areas at a northern site in St. Louis County and at the southern site in Le Sueur County. Because of the high watertable position near the lakes, effluents and sewage bubble to the surface causing pollution and creating a foul smell.

Outlook

The outlook for horticulture and associated businesses is encouraging, because global demand for various plants, flowers, ornamental trees, natural turf, and outdoor recreational activities continues to grow at high rates. The outlook for the domestic peat industry, therefore, will likely be governed by several variables, including future wetlands environmental regulation, 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 ornamentals from offshore.

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[1]Business Map-Belarus, 1992 (Biznes-karta, Belarus'): Published by MP "NIK," Moscow, V. 25, pp. 44-45, 78, 98, 156-157.

[2]Canadian Mineral Production Statistics 1995: Natural Resources Canada, Ottawa, Ontario.

[3]Statistical Abstract, 1995: Central Statistics Office, Dublin, Ireland, p. 361.

[4]NRRI Now. Technology Transfer Creates New Business: Nat. Resour. Res. Inst., Univ. of MN, Duluth, winter, 1996, pp. 6, 10-11.

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TABLE 1
SALIENT PEAT STATISTICS 1/

		1991	1992	1993	1994	1995
United States:						
Number of active producers		76	71	67	70	64
Production	thousand metric tons	632	599	616	574	588
Sales by producers	do.	703	652	612	552	660
Bulk	do.	348	288	343	255	339
Package	do.	355	365	268	297	320
Value of sales	thousands	$17,800	$16,700	$16,800	$15,300	$17,000
Average per metric ton		$25.29	$25.68	$27.54	$27.22	$25.80
Average per metric ton, bulk		$20.22	$19.31	$19.62	$18.70	$22.54
Average per metric ton, packaged or baled		$30.26	$30.71	$37.67	$26.44	$29.24
Exports	thousand metric tons	13	22	8	23	23
Imports for consumption	do.	573	639	648	669	669
Consumption, apparent 2/	do.	1,250	1,230	1,290	1,240	1,100
Stocks, December 31: Producers'	do.	298	308	269	252	384
World: Production		165,000	155,000	137,000 r/	129,000 r/	128,000 e/

e/ Estimated. r/ Revised.

1/ Data are rounded to three significant digits; except prices.

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

TABLE 2
RELATIVE SIZE OF PEAT OPERATIONS IN THE UNITED STATES 1/

	Active operations		Production (thousand metric tons)	
Size in metric tons per year	1994	1995	1994	1995
23,000 and over	9	10	380	405
14,000 to 22,999	2	5	37	79
9,000 to 13,999	4	1	45	9
5,000 to 8,999	11	10	71	61
2,000 to 4,999	10	9	28	22
1,000 to 1,999	9	7	10	8
Under 1,000	25	22	4	5
Total	70	64	574	588

1/ Data may not add to totals shown because of independent rounding.

TABLE 3
U.S. PEAT PRODUCTION AND SALES BY PRODUCERS IN 1995, BY STATE 1/

		Production	Sales		
Region and State	Active operations	Quantity (thousand metric tons)	Quantity (thousand metric tons)	Value 2/ (thousands)	Percent packaged
Northeast					
Pennsylvania	7	13	11	$294	43
Other 3/	7	60	34	1,410	44
Total	14	73	45	1,710	44
Great Lakes					
Michigan	10	150	173	5,510	86
Minnesota	7	23	24	2,070	59
Other 4/	13	63	66	1,430	79
Total	30	236	263	9,000	82
Southeast					
Florida	9	248	294	5,390	12
Other 5/	2	22	22	350	100
Total	11	270	316	5,740	18
West					
Washington	3	1	2	87	27
Other 6/	6	9	36	481	78
Total	9	10	38	568	76
Total or average	64	588	660	17,000	49

1/ Data are rounded to three significant digits; may not add to totals shown.

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

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

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

5/ Includes North Carolina and South Carolina.

6/ Includes Colorado, Iowa, Montana, and North Dakota.

TABLE 4
U.S. PEAT PRODUCTION AND PRODUCERS' YEAREND STOCKS
IN 1995, BY KIND 1/

Kind	Active operations	Production (metric tons)	Percent of production	Yearend stocks (metric tons)
Sphagnum moss	13	76,800	13	97,300
Hypnum moss	9	33,300	6	7,660
Reed-sedge	29	409,000	70	241,000
Humus	16	68,300	12	37,100
Other	2	521	(2/)	546
Total	64 3/	588,000	100	384,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Less than 1/2 unit.
3/ Number of active operations includes plants producing multiple kinds of peat.

TABLE 5
U.S. PEAT SALES BY PRODUCERS IN 1995, BY TYPE AND USE 1/

	Sphagnum moss			Hypnum moss			Reed-sedge		
	Quantity			Quantity			Quantity		
Use	Weight (metric tons)	Volume 2/ (cubic yards)	Value (thousands)	Weight (metric tons)	Volume (cubic yards)	Value (thousands)	Weight (metric tons)	Volume (cubic yards)	Value (thousands)
Earthworm culture medium	26	46	(3/)	227	500	$4	447	860	$9
General soil improvement	38,400	186,000	$3,360	8,980	23,400	535	282,000	654,000	6,030
Golf courses	--	--	--	1,590	3,500	38	4,180	8,830	179
Ingredient for potting soils	68	193	2	15,200	34,600	287	160,000	342,000	2,910
Mixed fertilizers	--	--	--	--	--	--	22,700	50,000	475
Mushroom beds	--	--	--	544	1,200	33	--	--	--
Nurseries	8,030	40,900	670	1,440	5,230	56	50,200	107,000	1,040
Packing flowers, plants, shrubs, etc.	582	3,010	105	--	--	--	--	--	--
Seed inoculant	--	--	--	--	--	--	4,540	10,000	77
Vegetable growing	--	--	--	1,700	3,780	32	136	300	5
Other	--	--	--	--	--	--	2,270	5,000	48
Total	47,100	230,000	4,130	29,700	72,100	985	526,000	1,180,000	10,800

	Humus			Other			Total		
	Quantity			Quantity			Quantity		
	Weight (metric tons)	Volume (cubic yards)	Value (thousands)	Weight (metric tons)	Volume (cubic yards)	Value (thousands)	Weight (metric tons)	Volume (cubic yards)	Value (thousands)
Earthworm culture medium	361	778	$7	--	--	--	1,060	2,180	$20
General soil improvement	26,700	56,000	501	--	--	--	356,000	919,000	10,400
Golf courses	1,260	2,560	23	--	--	--	7,030	14,900	241
Ingredient for potting soils	9,520	17,700	162	--	--	--	185,000	395,000	3,360
Mixed fertilizers	834	1,310	20	--	--	--	23,500	51,300	495
Mushroom beds	--	--	--	--	--	--	544	1,200	33
Nurseries	5,140	10,900	139	--	--	--	64,800	164,000	1,900
Packing flowers, plants, shrubs, etc.	340	667	6	369	581	$13	1,290	4,260	123
Seed inoculant	--	--	--	--	--	--	4,540	10,000	77
Vegetable growing	454	1,000	12	76	167	2	2,360	5,240	51
Other	11,600	19,100	241	76	167	2	14,000	24,300	291
Total	56,200	110,000	1,110	522	915	17	660,000	1,590,000	17,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Volume of nearly all sphagnum moss was measured after compaction and packaging.
3/ Less than 1/2 unit.

TABLE 6
AVERAGE DENSITY OF DOMESTIC PEAT SOLD IN 1995 1/

(Kilograms per cubic meter)

	Sphagnum moss	Hypnum moss	Reed-sedge	Humus	Other
Bulk	299	556	609	613	746
Package	254	483	558	693	--
Bulk and package	268	539	584	668	746

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

TABLE 7
PRICES 1/ FOR PEAT IN 1995

(Dollars per unit)

	Sphagnum moss	Hypnum moss	Reed-sedge	Humus	Other	Average
Domestic:						
Bulk:						
Per metric ton	55.53	21.25	20.48	26.00	31.81	22.54
Per cubic yard	12.70	9.04	9.54	12.18	18.14	9.93
Packaged or baled:						
Per metric ton	105.33	76.84	20.46	17.26	--	29.24
Per cubic yard	20.44	28.37	8.73	9.15	--	11.42
Average:						
Per metric ton	87.72	33.12	20.47	19.78	31.81	25.90
Per cubic yard	17.99	13.65	9.15	10.10	18.14	10.70
Imported, total, per metric ton 2/	XX	XX	XX	XX	XX	181.47

XX Not applicable.
1/ Prices are f.o.b. plant.
2/ Average customs value.

TABLE 8
U.S. IMPORTS FOR CONSUMPTION OF PEAT MOSS, 1/ 2/
BY COUNTRY

	1994		1995	
Country	Quantity (metric tons)	Value 3/ (thousands)	Quantity (metric tons)	Value 3/ (thousands)
Canada	665,000	$126,000	667,000	$121,000
Ireland	600	76	1,030	88
Other 4/	3,490	509	617	293
Total	669,000	126,000	669,000	121,000

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Poultry and fertilizer grade.
3/ Customs value.
4/ Includes Australia, Denmark, Finland, Germany, Netherlands, New Zealand, Norway, Sri Lanka, and United Kingdom.

Source: Bureau of the Census.

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

(Thousand metric tons)

Country 3/	1991	1992	1993	1994	1995 e/
Argentina: Agricultural use	1	1	10 r/	11 e/	10
Australia e/ 4/	11	11	11	15	15
Belarus: e/					
Agricultural use	XX	10,000	10,000	10,000	10,000
Fuel use	XX	350 r/	350 r/	348 r/ 5/	315 5/
Burundi	10	12	10 e/	10 e/	8
Canada: Agricultural use	856	740	801	914 r/	1,010 5/
Denmark: Agricultural use (sales)	184	195	189	190 e/	190
Estonia: e/					
Agricultural use	XX	5,000	4,500	4,500	4,000
Fuel use	XX	1,000 r/	1,000 r/	1,274 r/ 5/	952 5/
Finland:					
Agricultural use	220	355	350 e/	550	500
Fuel use	2,308	5,103	3,945 r/	5,000 r/ e/	5,000
France: Agricultural use e/	200	200	200	200	200
Germany:					
Agricultural use	2,876	2,718	2,739	2,800 e/	2,800
Fuel use	225 e/	188	180	180 e/	180
Hungary: Agricultural use e/	65	65	65	65	65
Ireland: e/					
Agricultural use	249 5/	300	300	250	300
Fuel use	4,770	6,200	6,500	6,450 r/	6,550
Latvia: e/					
Agricultural use	XX	5,000	4,500	4,500	4,000
Fuel use	XX	300	300	647 r/ 5/	421 5/
Lithuania: e/					
Agricultural use	XX	5,000	4,500	4,500	4,500
Fuel use	XX	400 r/	400 r/	411 r/ 5/	214 5/
Netherlands e/	300	300	300	300	300
Norway: e/					
Agricultural use	30	30	30	30	30
Fuel use	1	1	1	1	1
Poland: Agricultural and fuel use	167 r/	134 r/	410 r/	110 r/	110
Russia:					
Agricultural use e/	XX	80,000	70,000	60,000	60,000
Fuel use	XX	7,800 r/	2,500 r/	2,900 r/	3,000
Spain e/	75	70	70	70	70
Sweden: e/					
Agricultural use	263 5/	260	250	250	250
Fuel use	1,400	1,400	1,400	1,400	1,400
Ukraine: e/					
Agricultural use	XX	20,000	20,000	20,000	20,000
Fuel use	XX	1,000	1,000	1,000	1,000
U.S.S.R.: 6/					
Agricultural use e/	140,000	XX	XX	XX	XX
Fuel use	10,000	XX	XX	XX	XX
United States:					
Agricultural use	632	599	616	574 r/	588 5/
Fuel use	W	W	W	W	W
Grand total	165,000	155,000	137,000 r/	129,000 r/	128,000
Of which: Fuel use	18,700	23,700 r/	17,600 r/	19,600 r/	19,000

e/ Estimated. r/ Revised. W Withheld to avoid disclosing company proprietary data; not included in "Total." XX Not applicable.

1/ World totals, U.S. data, and estimated data are rounded to three significant digits; may not add to totals shown.

2/ Table includes data available through July 26, 1996.

3/ In addition to the countries listed, Austria, Iceland, and Italy produce negligible amounts of fuel peat and Venezuela is a major producer, but output is not officially reported and available information is inadequate for formulation of estimates of output levels.

4/ Excludes data from some States.

5/ Reported figure.

6/ Dissolved in Dec. 1991.