

**A PRELIMINARY INVESTIGATION OF THE POTENTIAL  
FOR A  
WILD MUSHROOM HARVEST IN NEWFOUNDLAND  
WITH PARTICULAR EMPHASIS ON THE BONA VISTA PENINSULA  
AND THE DEER LAKE REGION**

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**FINAL REPORT**

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## INTRODUCTION

This study, completed between May and November of 1992, was undertaken in order to assess the potential for a wild mushroom harvest in Newfoundland, particularly in the Bonavista Peninsula and the Deer Lake Regions. The harvest of wild mushrooms is a profitable venture in a number of different areas in North America including the west coast of Canada and of the United States. Newfoundland may have the potential for the development of such a harvest. The diversification of the Newfoundland economy to include wild mushroom harvesting would exploit a renewable resource, requires relatively low overhead investment, and could result in a significant number of seasonal jobs.

Four species of edible mushrooms are of particular interest for the development of a wild mushroom harvesting business in Newfoundland: Chanterelles, *Cantherellus cibarius*; Pine Mushrooms, *Armillaria ponderosa*; The King Bolete, *Boletus edulis*; and the Morel, *Morchella esculenta*. These species are marketed extensively throughout the world. They are widely distributed and might be expected to occur in this province.

Mushrooms are members of a larger group of organisms, the fungi. The mushrooms themselves are actually fruiting bodies which are formed periodically from the growing mass of threadlike mycelium which is found below ground. Many edible mushroom species are mycorrhizal and form symbiotic associations with the roots of specific forest trees; thus, these mushrooms cannot be cultivated commercially as are the common supermarket variety. Sufficient rainfall is one of the major environmental factors essential to mushroom production in the wild.

## OBJECTIVES

The objectives of this study, as stated in our original proposal, were completed and can be summarized under three headings:

- **Information on Local Mushroom Harvesting Activity**

Local mushroom experts and amateur collectors were consulted to determine the extent of mushroom collecting already occurring in Newfoundland and to gather available information on the occurrence and habitats of edible mushrooms in the province. Kimberley Gilliland was hired to contact people and to produce a preliminary account of mushroom harvesting activities and potential in Newfoundland. She also obtained habitat and land use maps for the Bonavista Peninsula and Deer Lake regions in order to identify potential habitats for edible mushroom species in these regions. A summary of her work is given in Section I of this report.

- **Field Trips to identify local edible mushroom flora**

Field trips were undertaken and preliminary surveys made of the edible wild mushrooms on the Bonavista Peninsula and in the Deer Lake region. An initial field trip in August by one of us (K. Egger) identified potential sites for more detailed study. In September John Darlow and John Goodier were hired to collect and identify edible species around Deer Lake, and Keith Egger collected in the Bonavista Peninsula area. Data collected on these field trips, in the form of species lists and habitat notes are summarized in Section II.

- **Information on the Wild Mushroom Harvesting Industry in North America**

Mushroom experts were contacted by us during a trip to the Annual Meeting of the Mycological Society of America in Portland, Oregon. During that trip government and industry in Washington and British Columbia were also consulted. Back in Newfoundland, we also met with people involved in the industry in Nova Scotia. A summary of information gathered during this time is included in Section III.

## RESULTS

### Section I: Information on Local Mushrooms Harvesting Activities<sup>1</sup>

Little formal mushroom study has been done in Newfoundland and published records of the distribution, abundance and local habitat of mushroom flora are essentially non-existent for this province. Exceptions include a brief publication from the Oxen Pond Botanical Garden by Dr. John Bridson describing some of the mushroom species found within the Garden itself and occasional references to collections from the west coast cited in national publications.

In Newfoundland collecting of wild mushrooms by local people occurs on a limited basis, with Chanterelles being the most commonly sought. Local harvesters are generally of European decent and pick for personal consumption only. Newfoundlanders traditionally do not pick and eat edible mushrooms.

Some commercial harvesting of edible wild mushrooms does occur in this province. Restaurants in St. John's regularly buy mushrooms in season from local pickers. However there are no records available of the species collected or the amounts paid to pickers; this lack of official records is common to the mushroom harvesting industry elsewhere as well. There has been at least one large commercial harvest of edible wild mushrooms in Newfoundland. Booth Reid of White Bay harvested mushrooms commercially from Pasadena to the Northern Peninsula for several years. Mr. Reid taught local people to identify and harvest local mushroom species. He established a market for fresh and pickled mushrooms in Germany and Boston at \$1.25/lb. He kept 60 pickers employed from May until snowfall each year. During peak mushroom production individuals were able to pick 125 to 200 lb/day. Mr. Reid gave up the business when, after several attempts, he was unable to get the funding of \$30,000 to open a cannery in Newfoundland.

According to local collectors all four mushroom species of interest occur in the province and are found in both the Bonavista Peninsula and Humber Valley. Generally speaking mature and over-mature Black Spruce-Balsam Fir forests are the best habitat for these mushroom species, although Morels are often found after forest fires. Morels are harvested in May and June during wet weather. Chanterelles are found clustered in the ground in open woods from July through October. Boletes are harvested relatively warm wet weather from June through October. The pine mushroom is found in the highest quantities from September through November in wet regions at elevations less than 2000-3000 feet. Dr.

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<sup>1</sup>Information in this section is largely from a report prepared for us by K.Gilliland, a copy of which can be made available upon request.

Scott Redhead (Agriculture Canada, Ottawa) suggested the Mock Oyster *Suillus clavipes* as an alternative to *Boletus edulis* as a mushroom for harvest. It is a choice edible mushroom, easily identified and is common to Larch Forests in Newfoundland.

#### Identification of potential areas for mushroom harvest

Geographical, soil and land use maps were obtained or produced for the Bonavista Peninsula and the Humber Valley.

The sea has a dominating influence on the climate of the Bonavista Peninsula. The Labrador current brings cold water throughout spring and early summer, causing widespread sea fog. Sea ice is common in the early months of the year and keeps the temperatures low. Precipitation is spread fairly evenly throughout the year (mean rainfall approximately 860 mm) with the months of July, August and September slightly drier than average. The vegetative season (temperatures above 12.5 C) starts around May 15 and lasts about 160 days until around October 25.

The geology of this region is dominated by green to black greywacke, slate and sandstone; and red, green, and grey pebble conglomerates of sandstone, and shale beneath predominantly humo ferric podzolic soils and ferro humic podzolic soils. The landscape of the peninsula is extensively forested with the local heath vegetation. Good forest growth (Black Spruce, Balsam Fir and Tamarack) is localized to slopes of a few protected valleys. Thinly peat-covered treeless countryside is common on the east side. Land use in the Bonavista area is not extensively developed and is primarily agriculture development with a few small forestry reserves throughout the peninsula.

Humber Valley region is characterized by late springs and early frosts, and summers are short but warm. Mean daily summer temperatures from June to August range from 11.7 to 6.4 C, with temperatures above 30 C common. Annual precipitation ranges from 1023 to 1133 mm. The geology of the Humber Valley is dominated by sandstone and siltstone beneath predominantly humo ferric podzolic soils and ferro humic podzolic soils. While the terrain in this region is dominated by sandy soils over shale bedrock, nutrient rich seepage waters are held in the rooting zone by bedrock or fragipan layers and this area supports some of the most productive Balsam Fir forest stands in Newfoundland. Land use in the Humber Valley is much more developed than in the Bonavista region. Vast expanses of land are developed for agricultural and silvicultural purposes and forestry reserves.

## Section II: Field Trips to Identify Local Mushroom Flora

An initial field trip in August by Keith Egger identified potential sites for more detailed study. In September John Darlow and John Goodier were hired to collect and identify edible species around Deer Lake, and Keith Egger collected in the Bonavista Peninsula area. In the Deer Lake region nineteen sites were visited and a total of 24 mushroom species identified. In Bonavista fourteen sites yielded 38 different mushroom species of which at least 13 are edible. Tables 1 and 2 summarize the species collected and the habitats in which they were found. Boletes were found at both sites, Chanterelles in the Bonavista area, and the Pine mushroom tentatively identified from the west coast. While these collections are encouraging, their limited nature must be acknowledged. This sample is small both in terms of the area covered and the range of time collections were made. Morels, for example, fruit in the Spring and thus its absence from the list of species collected is to be expected. This applies to numerous other mushrooms as well.

Table 1.

Results of Fungal Collecting Trip - Deer Lake Region - September 10-14, 1992  
 Collected by John Darlow and John Goodier

	SITE NUMBER																								
	1	2	3			4	5	6	7	8	9	10			11	12	13	14	15	16	17	18	19		
			A	B	C							A	B	C											
<i>Boletus</i> sp. I						x																			
<i>Boletus</i> sp. II						x																			
<i>Boletus</i> sp. III	x	x	x	x	x		x							x	x						x			x	
<i>Cortinarius armillatus</i>	x		x		x				x	x															
<i>Cortinarius</i> sp.			x		x																				
<i>Cantharellus clavatus</i>			x																						
<i>Cantharellus tubaeformis</i>																									
<i>Coprinus comatus</i>																									
<i>Coprinus</i> sp.																									
<i>Dentinum</i> sp.		x							x																
<i>Helvella crispa</i>									x																
<i>Hydnum</i> sp.																									
<i>Lepiota americana</i>																									
<i>Lactarius</i> sp. 1																									
<i>Lactarius</i> sp. 2																									
<i>Lactarius</i> sp. 3																									
<i>Lycoperdon perlatum</i>																									
<i>Lycoperdon pyriforma</i>																									
<i>Lycoperdon</i> sp.																									
<i>Suillus grevillei</i>	x																								



	SITE NUMBER																							
	1	2	3			4	5	6	7	8	9	10			11	12	13	14	15	16	17	18	19	
			A	B	C							A	B	C										
Suillus sp. 1 (prob. luteus)																								
Suillus sp. 2																								
Suillus pictus																								
Clitopilus sp. (prunulus)?																								
(see field notes, last page)																								

**Notes**

1. Between Schiffeld Lake and Birch Lake - immediately east of Fort Birchy Campground and Restaurant; down a dirt road a short distance from the TCH.
2. SE shore of Deer Lake - between lake and road near Little Harbour.
3. Opposite side of road from site #2 of Little Harbour - at end of dirt road in vicinity of old abandoned gravel pit.
4. Dear Lake east of Pynn's - at end of dirt road at the site of the communication tower (at summit of 352 m hill).
5. North side of Deer Lake west of Nicholasville - just west of western tributary of Coal Brook. Followed an unworked track parallel to brook and then west and cut into woods.
6. North side of Deer Lake - at mouth of North Brook at the Salmon Enhancement Project site.
7. Unpaved road going NW from western corner of Sandy Lake - drove until reached a brook unable to cross in car.
8. Road going toward Jackson's Arm, turning off onto a dirt road that heads toward Brown's Cove (approx. 2 km).
9. Just south of Bayside/Hampdon - on west side opposite a working gravel pit. Walked uphill along and cut into woods.
10. Sir Richard Squires Memorial Park - just beyond entrance to campground on south side of road.
11. Sir Richard Squires Memorial Park - at entrance to campground.
12. Sir Richard Squires Memorial Park - exactly 2.6 km from large bridge over Little Falls, north side of road.
13. Cormack region community pasture - 5.7 km from site #12 back toward Cormack.
14. Highway 430 in direction of Gros Morne - less than 5 km after Cormack turnoff; turned off along a dirt road on the left side, drove past lake.
15. Parking lot verge of Interpretation Centre in Gros Morne National Park.
16. St. Paul's (Gros Morne National Park) - Mr. Roberts Grocery/Variety Store.
17. North side of TCH approx. 8/9 km east of Deer Lake.
18. Highway 401 (toward Howley) along Partridge Berry Point Road (east side of Highway 401, across causeway 4.5(.6) km from highway).
19. South side of Birch Lake - 10 km southwest of Fort Birchy Restaurant and Campground and site (1).

Table 2. Results of Fungal Collecting Trip - Bonavista Peninsula Region - September 15-16, 1992

	SITE NUMBER													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	A	B												
X														
P			S					S						
X							S							
E													S	
?											S			
E	A													
?							A							
E					S							S		
E				A		A	A							
E					S									
X														
X			S									S		
E			S											
X			S		A			S		S		S	A	
X			A	A		A	A	S	A	A	A	S		
X					A	S	S	S					A	
X		A												
X		S	A											
P		S	S	A				S	S	S		A		S
P		S	S	A						S	A	S		
E		S				S	S						S	S
X			S		S									
E		A	S			S							S	S
E	A	S		A		A		S		A	S	S		A
E		A	A	A		S	S			S	S	A		
?	A				S	A							A	
?														
E	S	S	S			A	S	A				S	S	
E	S	S			S						A			
?														
P					S					A				
X						S								S
X														
X														
X		S												S

E	Russula cfr brevipes																	
P	Russula emetica sensu lato			A				S	S					A	A	A	S	A
X	Russula rosacea		S									A						
?	Russula sp. #1					S	A					S						
E	Suillus cfr cavipes				A				S						A			A
E	Suillus grevillei									A								
?	Tricholoma sp.						S			S	S							

The column to the left of each name indicates whether the species is edible (E), poisonous (P), questionable (X), or whether edibility is unknown.

The letter to the right of each name indicates presence at the site number indicated, and whether the mushrooms was scarce (S) or abundant (A).

**Site Locations:**

1. Approx 5 km east of Milton: A on north side of road, B on south side of road.
2. Smith Sound Provincial Park, Highway 232.
3. Brooker Bridge on Highway 232 approx. 3 km from junction with Highway 230.
4. Highway turnoff, 3 km south of Morley's Siding on Highway 230.
5. Roadside turnoff 8.5 km south of Sweet Bay.
6. Rattle Falls Provincial Park, Highway 230.
7. Near junction of Highway 230 and turnoff to Trinity, Bonavista Bay.
8. Approx 3 km south of junction of Highway 230 and 239.
9. Approx 12 km south of Melrose on Highway 230.
10. Approx 1 km south of junction of Highway 237 and 235, on Amherst Cove Forest Resource Road.
11. Approx 5 km east of King's Cove on Highway 235.
12. Jiggling Head Provincial Park, Highway 235 near Summerville.
13. Malcolm Brown Memorial Park, Musgravetown, Highway 233.
14. Burned area approx 15 km east of Bunyans's Cove on Highway 233.

**Site Notes:**

- Site 1A. Approx 5 km east of Milton, on north side of road. Boggy area black spruce and larch as predominant tree species. Shrub layer dominated by *Kalmia*. Ground cover dominated by sphagnum and *Cladina* lichen.
- Site 1B. Approx 5 km east of Milton, on south side of road. Drier forest sites dominated by black spruce. Shrub layer dominated by Alder and *Kalmia*.
- Site 2. Smith Sound Provincial Park, Highway 232. Forested site dominated by black spruce with some alder and birch. Shrub layer dominated by *Prunus* and dogberry. Ground cover dominated by bunchberry (*Cornus canadensis*).
- Site 3. Brooker Bridge on Highway 232 approx. 3 km from junction with Highway 230. Forested site dominated by alder and poplar, with some scattered spruce.
- Site 4. Highway turnoff, 3 km south of Morley's Siding on Highway 230. Wet forest site dominated by black spruce and larch. Shrub layer dominated by *Kalmia* and *Menziesia ferruginea*. Ground cover mostly sphagnum moss.
- Site 5. Roadside turnoff 8.5 km south of Sweet Bay. Dry forest site dominated by alder, fir and spruce, with a bit of birch. Evidence of wood cutting for firewood.
- Site 6. Rattle Falls Provincial Park, Highway 230. Dry forest site dominated by alder and spruce mixed with red maple. Shrub layer contains *Prunus*.
- Site 7. Near junction of Highway 230 and turnoff to Trinity, Bonavista Bay. Mature spruce site mixed with fir.
- Site 8. Approx 3 km south of junction of Highway 230 and 239. Mature spruce site mixed with fir and alder.
- Site 9. Approx 12 km south of Melrose on Highway 230. Bog habitat with black spruce and larch. Shrub layer dominated by *Kalmia*. Ground cover dominated by sphagnum and *Cladina* lichen. Few mushrooms.
- Site 10. Approx 1 km south of junction of Highway 237 and 235, on Amherst Cove Forest Resource Road. Heavily cut area with some mature spruce and larch, but dominated by *Prunus*, dogberry, and alder.
- Site 11. Approx 5 km east of King's Cove on Highway 235. Dry forest site with spruce, larch, maple, and some birch. Shrub layer dominated by alder and *Kalmia*. Ground cover predominantly bunchberry.
- Site 12. Jigging Head Provincial Park, Highway 235 near Summerville. Dry forest site dominated by spruce.
- Site 13. Malcolm Brown Memorial Park, Musgravetown, Highway 233. Dry forest site dominated by poplar, spruce, and fir. Little shrub and ground cover in young spruce forest.
- Site 14. Burned area approx 15 km east of Bunyans's Cove on Highway 233. Estimate site burned approx 8-10 years ago. No tree cover. Shrub layer dominated by blueberry.

### Section III: Wild Mushroom Harvesting in North America

#### 1. Oregon & Washington

Experts consulted regarding the mushroom harvesting operations in the Pacific Northwest of the United States included Dr. Randy Molina (Forest Service, Corvallis, Oregon), Drs. Nancy Weber and Bill Denison (Oregon State University) and Lorelei Norvell and Dr. Joseph Ammirati (University of Washington). In addition they recommended additional contact persons, including Ken Russell (Washington State Department of Natural Resources). Dr. Molina and colleagues have recently produced a document on the biology, ecology and social aspects of wild mushroom harvesting, the abstract of which is appended.

#### Structure of the Industry

Direct contact with restaurant and gourmet food houses, and export operations, are handled by dealers. The dealers purchase harvested mushrooms from buyers who set up collection stations for buying mushrooms from pickers. Most buyers set up stations and buy from independent pickers. There is considerable competition among buyers since pickers will sell to whomever gives them the best price. This structure is changing as buyers move to employ their own pickers. This change is due to the increasing commercialization of harvesting. For example several forest companies now recognize the value of mushroom harvesting on privately owned land, and now sell the picking rights for mushrooms such as the Pine Mushroom to buyers on a competitive basis. In a recent precedent, the state-owned Oregon National Forest sold rights to buyers to pick Morels on a burned site under their jurisdiction. These changes are making it increasingly difficult for independent pickers and the industry is moving towards buyer-employed pickers.

The total pounds and dollars collected from wild mushroom harvesting in Washington during 1989 and 1990 are given in Table 3 (adapted from Molina et al. 1992). The final total of \$1.2 million dollars is estimated to be only one tenth of the actual amounts since records are incomplete and, as elsewhere, much harvesting activity goes unreported. The variety of mushrooms collected in Washington illustrates the importance of knowing the mushrooms flora and being able to take advantage of different species in addition to those regularly sought.

#### Impacts of Mushroom Harvesting

One of the most interesting impacts of commercialization of mushroom harvesting has been a recent court challenge to logging companies on the basis that mushroom harvesting is a greater value than timber harvesting.

As the economic impact of mushroom harvesting increases so does the number of pickers. This is having serious side effects. First, there are impacts

upon wildlife, including species (for example the Spotted Owl) that require tracts of undisturbed land. Second, there are infringements of trespass laws and damage to private property. In particular, more pickers are using all terrain vehicles for access, and unscrupulous pickers have cut fences and otherwise damaged areas. Third, there are social problems caused by the movement of migratory pickers into areas. Finally, there are impacts upon the environment, including the compaction of the soil and direct impacts of harvesting upon mushroom populations.

Several attempts are being made to determine the impacts of the latter. We talked with Lorelei Norvell and Joe Ammirati about their project to access impacts of harvesting on Chanterelles in the Bull Run Watershed of the Mt. Hood National Forest in Washington State. They are investigating the effects of different harvesting methods and soil compaction on the yield of forest mushrooms. Since this study is just recently under way, they do not have conclusive results. However it appears that harvesting is not having a negative short-term impact, and that it may actually increase production in the short-term. It is important to determine if this pattern will be observed on a long-term basis. There is also work centred at Oregon State University to look at the biomass of truffles in the Andrews Experimental Forest, and to determine which age-classes of trees with which these fungi are associated have the highest productivity. Such studies are necessary to determine the productivity of mushrooms in forests that are not presently being commercially harvested in order to monitor impacts of harvesting.

Table 3. Total pounds and dollars recorded as collected from wild mushroom harvesting in Washington, 1989-1990. Adapted from Molina et al. 1992.

Fungus species	1989		1990	
	pounds	dollars	pounds	dollars
Tricholoma magnivalare	2,600	35,075	106,327	602,530
Boletus edulis	4,060	24,315	15,799	122,655
Cantherellus spp.	248,850	586,355	277,530	437,922
Sparassis radicata	2,145	6,366	10,999	16,549
Laeptiporus sulphureus	5	15	75,836	88,087
Other	38	111	6,853	11,165
Totals	257,700	652,247	493,344	1,278,910

## 2. British Columbia

Sharmin Gamiet of the University of British Columbia strongly recommended that we speak with one particular individual in the wild mushroom harvesting industry in B.C. Betty Shore, a long-time mushroom entrepreneur, was most helpful in supplying information on the B.C. industry from both an economic and organizational perspective, as well as on the day-to-day running of such an operation. Shore and a partner were among the first people to develop the industry in the Pacific Northwest and originally operated out of Seattle, Washington under her company, Madam Mushroom Inc. Madam Mushroom was one of the largest mushroom operations in North America, shipping over a million pounds of wild mushrooms annually. She has travelled regularly to Europe, and particularly to Japan as a consultant in wild mushroom harvesting. Presently, she runs a smaller operation, Betty's Best Inc., out of Britannia Beach, just North of Vancouver.

Betty's best deals mainly in Chanterelles, Morels, Pine Mushrooms and more recently the False Morel (*Gyromytra esculenta*). While official records are unavailable, we estimated approximate gross dollars paid for wild mushrooms in B.C. in 1991 based on the trade done by Betty's Best (Table 1). It is clearly a multimillion dollar industry with a rough total estimate of \$10 million dollars of the three species listed.

Betty's Best Inc operates through a network of buyers who buy directly from wild mushroom harvesters or "pickers". The company trains buyers in quality control and supplies some of the basic equipment. Copies of her Buying Station Operators Application forms and the contract between the company and the buyers are appended. The buyers work for the company and are paid by commission depending on the amount of produce they provide. Pickers are considered to be independent and self-employed. The amount paid to the pickers varies, for example the Pine Mushroom is bought for \$5 to \$25 per pound depending on the quality, and up to \$40 per pound for top grade False Morels.

A tour of her processing area revealed a streamlined process requiring relatively little capital outlay. Buyers ship fresh graded mushrooms via Air Freight to the nearby airport and at Britannia Beach mushrooms are examined, crated securely and shipped to international markets. While they have previously dried and pickled mushrooms for export, most of their business today is in fresh produce thus taking advantage of the better prices. Produce usually reaches the markets within 48 hours of picking.

Shore emphasized the importance of quality control and care in training and maintaining competent buyers in her network of fifteen buying stations.

Table 4. Estimate of the total dollars collected from wild mushroom harvesting of three edible wild mushroom species in British Columbia, 1991.

Fungus species	Betty's Best Inc.	No. of dealers	British Columbia
Morels	\$ 500,000	5	\$2,500,000
Chanterelles	200,000	8	1,600,000
Pine Mushrooms	750,000	8	6,000,000
<b>Total</b>	<b>\$1,450,000</b>		<b>\$10,100,000</b>

### 3. Nova Scotia

CB Trade Inc. is a company located in Cape Breton involved in the wild mushroom harvesting industry in Nova Scotia. We met with Kurt Frohlich, and Werner Heim, President and Manager, respectively, of the company. CB Trade is involved in the export of Chanterelles in particular and is expanding to include Boletes. It is a Swiss-based company with well established access to the large European wild mushroom market. CB Trade has a large \$300,000 processing plant in Orangedale, Nova Scotia which is the centre for their operations. The company could not meet the market demands this year and visited Newfoundland to determine whether there were enough mushrooms here to supplement their exports from Nova Scotia. They expressed a keen interest in cooperating with us in our efforts to determine the mushroom resource base in this province and in buying Newfoundland wild mushrooms. They also emphasized the importance of training people in mushroom harvesting and quality control; copies of two of their teaching brochures are appended.



#### 4. MSA Portland, Oregon

At the Annual Meeting of the Mycological Society of America held in Portland Oregon (August 7-12, 1992) discussions were held with other mycologists on the harvest of wild mushrooms. Of particular interest were the following.

In a special symposium on fungal biodiversity, keynote speaker Dr. Eef Arnolds of the Agricultural University in the Netherlands addressed the topic "The decline of fungal species diversity in Europe". Arnolds comprehensive and stimulating presentation stressed the importance and the difficulties in assessing changes in mushroom abundance. In general fungi which decompose wood are on the increase in Europe, while many mycorrhizal species are declining. Included in the latter category are many edible fungi and the Chanterelle, in particular, shows significant decline in Europe. Along with their economic importance, the importance of these fungi in global ecology and as indicators of environmental change was discussed.

At the same symposium, Lorelei Norvell's study of the effects of harvesting on the yield of Chanterelles in Washington (discussed in Section III.1 of this report) was greeted as an important contribution and appeared to be the only such study of its kind being undertaken in North America at the present time.

Informal discussions were also held with Dr. Shannon Berch (University of B.C., presently with Forestry Canada) and Sharmin Gamiet (also of U.B.C.). Berch is a mycorrhizal expert and along with Gamiet is presently studying biodiversity of macrofungal communities in old growth forest in south coastal B.C. They are interested in the impact of harvesting and will be collaborators with us on an application for an NSERC Strategic Grant application to study macrofungal biodiversity, population structure and harvesting effects in Canadian forests.

## CONCLUSIONS

- The wild mushroom harvesting industry is a multimillion dollar industry in the Pacific Northwest, and is operating as close to home as Nova Scotia.
- Potential markets exist for the sale of wild edible mushroom species, particularly in Europe and Japan. CB Trade has expressed interest in buying local mushrooms for export to Europe.
- Economically important edible mushroom species are found in Newfoundland, both on the west coast and the Bonavista Peninsula. A commercial wild mushroom harvest operated for several years on the west coast.
- The extent and quality of the resource is largely unknown. One of the most important questions remaining is whether edible mushrooms are present in sufficient abundance to sustain a wild harvesting industry. In addition, prices paid vary greatly depending on the quality of the product and this will greatly influence the viability of the industry in the province. Considerable fluctuation on an annual basis must be expected as in the production of any natural product; the industry should be structured to deal with these events.
- Elsewhere it is becoming increasingly evident that the biology, ecology and societal impacts of wild mushroom harvesting must be addressed along with economic and marketing concerns.
- Newfoundland may have a significant advantage for sales on the European markets. This is because of its proximity to Europe, and because mushrooms, especially Chanterelles, fruit later here than they do in Europe and will be available when there is little competition from European pickers.

## RECOMMENDATIONS

- To test the resource base, we recommend that a network of buying stations be established in Newfoundland. These should be set up with a relatively low initial outlay. The organization could follow that already established elsewhere. An initial outlay of cash to pay pickers will be required. There should be collaboration with established dealers in Nova Scotia to gain access to markets and to facilitate the export of produce to the marketplace. Stress should be placed upon quality of product and the careful training of pickers and buyers in wild mushroom harvesting techniques.
- At least one expert field mycologist should be available on a full term basis during the initial collecting season to facilitate the training of buyers and pickers and to further assess the extent of the resource in the province by combining travel for training with extensive site identification and field collection.
- Guidelines should be carefully established at the outset for the regulation of the industry.
- To address the questions related to and the impacts of wild mushroom harvesting in the province basic research should be conducted into the impact of such harvesting on the structure of mushroom populations in the field and on the forest ecology. We have already submitted one application for funding for such a study on the Avalon Peninsula, and are collaborating with researchers in British Columbia on a second, larger proposal. These studies are long term projects and will require significant financial support for salaries for field workers in particular.

## APPENDICES

- I. Betty's Best Contract and Agreement Forms
- II. CB Trade Brochures
- III. Abstract of paper by Molina & colleagues