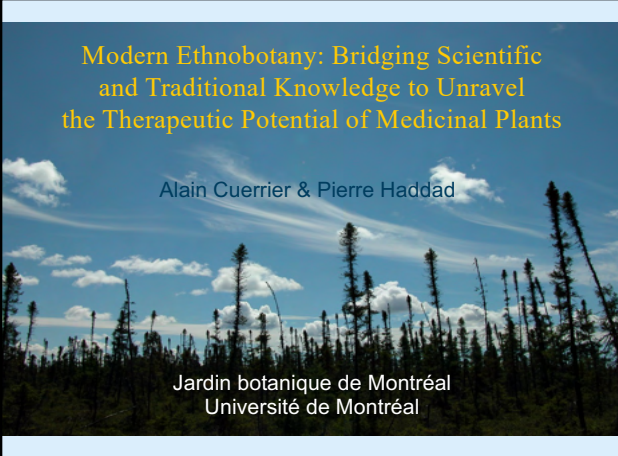


Modern Ethnobotany: Bridging Scientific and Traditional Knowledge to Unravel the Therapeutic Potential of Medicinal Plants

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Ethnobotany approach

- Are more likely to show pharmacological activities than plants randomly chosen;
- Show little or no toxicity;
- Are usually abundant;



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WHY?

Traditional uses of plants far exceed the number of phytochemical/pharmacological studies

Healers have thus more knowledge of the medicinal diversity than us

Ethnobotanical knowledge is eroding

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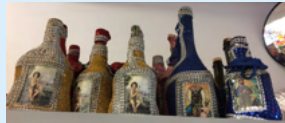
Ethnobotany
Medicinal and food plants



Harvesting seaweeds

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Haitian medicinal plants



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Ethnobotany is also
to be working with
herbalists like David
Winston



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John W. Harshberger (1869-1929)

His original concept has been transformed over the last century.

The study of ethno-botany aids in elucidating the cultural position of the tribes who used the plants for food, shelter or clothing. *The well-known classification of men into savage, pastoral, agricultural and civilized will roughly serve our purpose.*

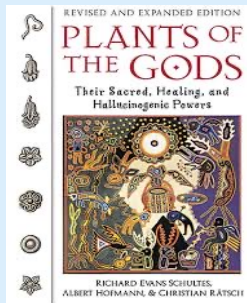
Harshberger, J. W. 1896. The purposes of ethnobotany. *Botanical Gazette* 21: 146-154

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Richard Evans Schultes (1915-2001)



Known as the father of modern ethnobotany



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Random sampling versus ethnobotany

- 2 studies involving NCI on HIV
 - 2% / 15%
 - 6% / 25%

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Toxicity

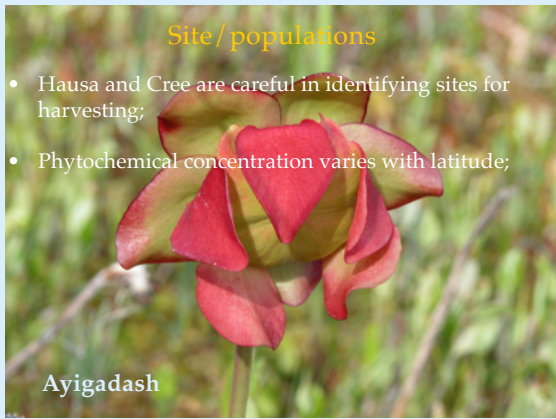
- 2 types of manioc (*Manihot esculenta*)
— toxic and non-toxic;
- You need to know how to prepare remedies;



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Site / populations

- Hausa and Cree are careful in identifying sites for harvesting;
- Phytochemical concentration varies with latitude;

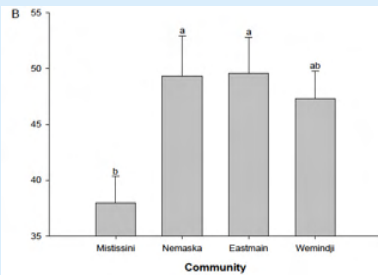


Ayigadash

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Kachichepukw; *Rhododendron groenlandicum*,
Thé du Labrador

Concentration in phenols



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Organ (*Picea glauca*)

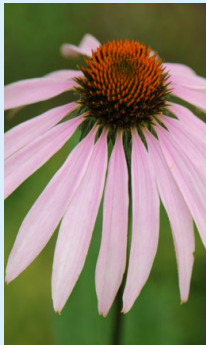
Organs	Toxicity (apoptosis)	Hyperglycemia	Hypoglycemia
Needles	Non-toxic even at high dose	Protection	Protection
Cones	Toxic at high dose	Diminishes glucose tolerance	No activity
Bark	Toxic at high dose	No activity	No activity

Pharmacological activity recorded for 3 different plant parts of white spruce (PC12 peripheral neuronal precursors)



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Preparation and posology



Bad research due to lack of knowledge;

Am J Med, 1999 Feb;106(2):138-43

A randomized controlled trial of the effect of fluid extract of *Echinacea purpurea* on the incidence and severity of colds and respiratory infections

Grimm W, Müller H.H.

•Inadequate dosing of Echinacea – 4 ml per day instead of the usual 12-16 ml per day

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Inuit Ethnobotany *Rhodiola rosea*



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Working with NG & communities to establish medicinal plant industry

Tulligunnak = Roseroot



2. Biology; gardens



1. Consultations!



3. Opportunity Plan

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A question of humility

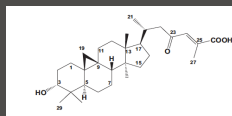
By keeping tradition within modern science, it will remind us that healing is more than just molecules operating at specific levels;

It keeps us from stalemate (blind reductionist approach);



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Studying the antidiabetic potential of Boreal forest plants stemming from Cree traditional pharmacopeia

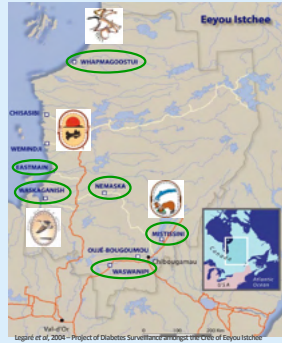


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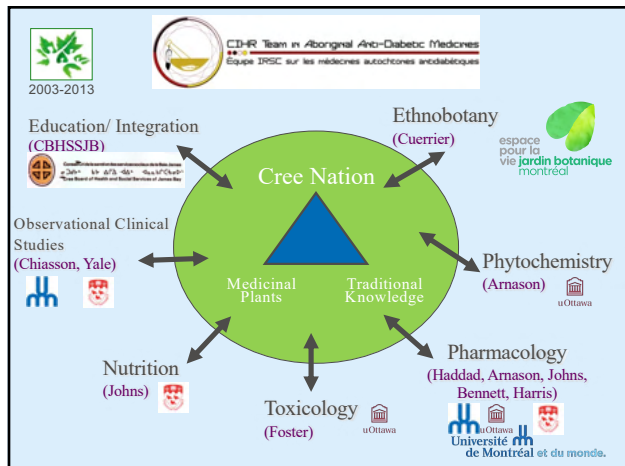
James Bay Cree and Their Territory

- Population**
- 21,000+ Eeyouch (Cree)
 - 9 communities
 - 6 communities involved in the project

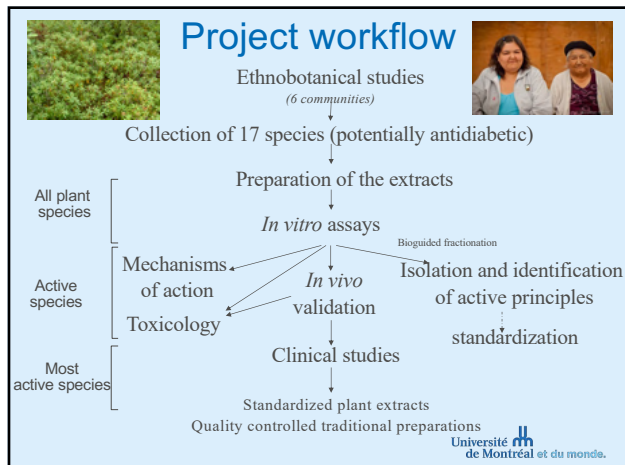


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Preclinical Pharmacology

In vitro studies

Primary Antidiabetic Activity
(hypoglycemic potential)

In vitro

Glucose Absorption in CaCo-2 cells

Glucose Production: Inhibition of G6Pase
Stimulation of glycogen synthase

Glucose Uptake in C2C12 myoblasts

Differentiation
Glucose Uptake
Adipokine Secretion in 3T3-L1 cells

Insulin secretion in INS832/13 cells
Pancreatic lipase inhibition

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PLANT	PLANT NAME			EFFECTS IN TISSUES RESPONDING TO INSULIN						
	Cree	English	Latin	Increasing muscle glucose uptake	Reducing liver glucose release	Increasing liver glucose storage	Improving response of fat cells	Preventing fat cell development	Reducing glucose entering from the gut	
	Walnagani	Tamarack	Larix laricina (DuRoi) Koch	✓	—	✓✓	✓✓	—	✓✓	
	Kachichipukew	Labrador tea	Rhododendron granatidum (Oeder) Koen & Judd	✓	✓	✓✓	✓✓	—	✓✓	
	Inashit	Balsam Fir	Abies balsamifera (L.) Mill.	✓	✓✓	✓✓	—	—	—	
	Ayigadash	Purple Plover plant	Sambucus purpurea L.	✓✓	—	✓✓	—	—	✓✓	
	Wishichimma	Mountain cranberry	Vaccinium vitis-idaea L.	✓✓	✓✓	—	✓✓	—	✓✓	
	Milus	Balsam poplar	Populus balsamifera L.	—	—	—	—	✓✓	✓✓	
	Atushpi	Speckled alder	Alnus incana (DuRoi) R.T. Clausen	✓	✓	✓✓	—	✓✓	✓✓	
	Minhiw	White spruce	Picea glauca (Mill.) B.S.P.	—	✓✓	✓✓	—	✓	✓✓	
	Mushkuminanatikw	Showy mountain ash	Sorbus decora (Steud.) C.K. Schindler	✓✓	—	✓✓	—	—	✓✓	
	Wishichipukesh	Northern Labrador tea	Rhododendron tomentosum Hemps.	—	—	✓✓	✓✓	—	✓✓	

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Preclinical Pharmacology

In vivo studies

Standard Diet (CHOW) — ~4% of energy derived from lipids

High-Fat Diet (DIO) — ~35% of energy derived from lipids

Plants

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ETHICAL CONSIDERATIONS

Specific concerns of Elders, communities, Grand Council of the Cree and Cree Board of Health concerning this project

- Safety issues in using traditional medicines for diabetes care
- Use of Eeyou knowledge without consent
- Ownership of intellectual property
- Question of partnership between Elders and Researchers
- Misuse of medicines by others (health concern)

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Important principles of agreement

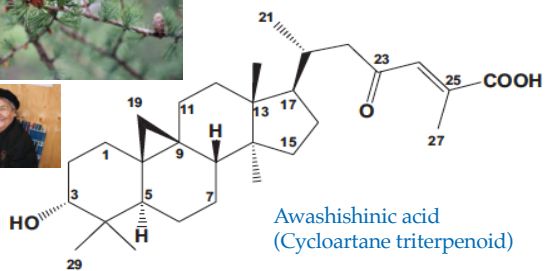
1. Confidentiality and Eeyou control over IK
2. Review of publications
3. Collaborative research
4. Joint ownership of intellectual property
5. Benefit-sharing



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Respecting Sam Awashish and his family



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CONCLUSIONS

- Many Cree medicinal plants can help decrease blood sugar
- They improve the action of the body's own insulin by acting differently on muscles, fat, the liver and the gut
- Some plants help reduce fat accumulation in the liver, lose weight or help protect nerves
- This work can help Elders, healers and doctors to tailor the medicinal plants for diabetes and its complications
- Some plants can also be combined
- Medicinal plants can be mixed with diabetes drugs but dose adjustments can be made as with other drug-drug interactions

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Megwetch!
Merci!
Thank you!
Questions?



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