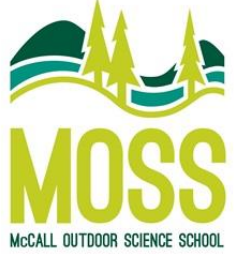


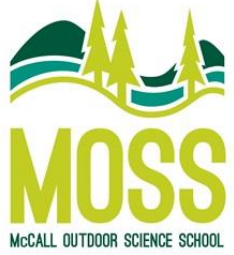
University of Idaho



Chemistry Experiential Learning Through Native Plants

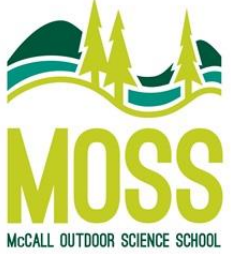
Mark Wolfenden PhD

McCall Outdoor Science School
Natural Resources and Society
College of Natural Resources
University of Idaho



From Here to There





Previous Projects

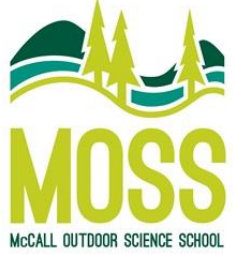
Study of Biological Processes Mediated
by Carbohydrate-Protein Interactions

Influenza Detection via Scent

Siderophore Based Bacteria Capture

Microbe Inspired Novel Antibiotics

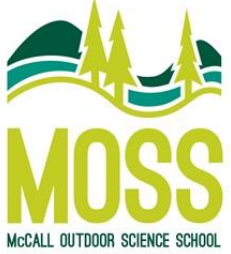
Biocorrosion of Carbon Steel



Current Projects

Connecting Plant Pheromones to Fluorescence Based
Remote Sensing

Assessing Plant Species on an Elevational Gradient in The
Frank Church River of No Return Wilderness

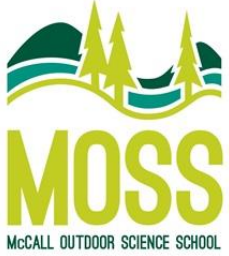


Questions to Answer

How do native plants and organic chemistry fit together?

Why does this matter?

What is happening at MOSS with organic chemistry and plants?



Plants Capture Human Imagination

A screenshot of an NPR website article. At the top, the NPR logo is on the left, and navigation links for "find stations", "news", "arts & life", "music", and "programs" are in the center. On the right, there are links for "shop", a user profile icon, and a search icon. Below the navigation bar, the article title "krulwich wonders" is displayed in orange and grey, followed by "ROBERT KRULWICH ON SCIENCE" in smaller grey text. The main article title "Plants Talk. Plants Listen. Here's How" is in large black font. Below it is the date and time "April 29, 2014 · 2:32 PM ET" and the author's name "ROBERT KRULWICH" in a white box. The article text begins with "They don't have eyes. Or ears. Or what we would call a nervous system. But plants can talk. And they listen. Let me show you how." and continues with "First, we'll need a plant eater. This one's perfect: It's an aphid, a hungry little critter who loves to munch on fresh, green leaves ...". On the left side of the article, there are social media sharing icons for Facebook, Twitter, Google+, and Email.



Plants Talk. Plants Listen. Here's How

April 29, 2014 · 2:32 PM ET

ROBERT KRULWICH

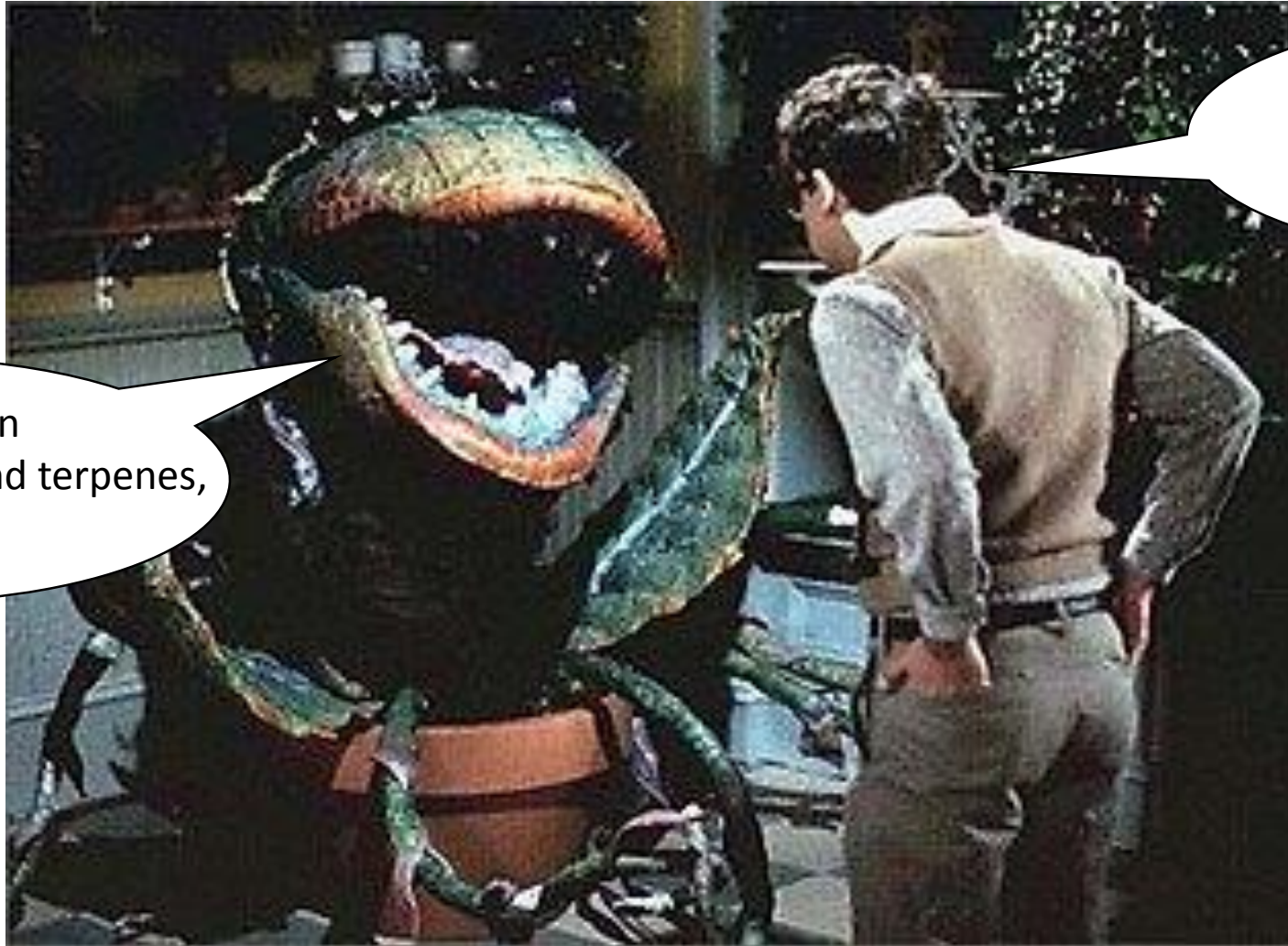
They don't have eyes. Or ears. Or what we would call a nervous system. But plants can talk. And they listen. Let me show you how.

First, we'll need a plant eater. This one's perfect: It's an aphid, a hungry little critter who loves to munch on fresh, green leaves ...

Plants Capture Human Imagination



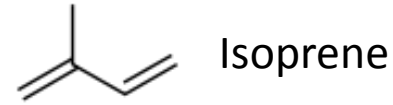
Plants use Organic Chemistry to Communicate



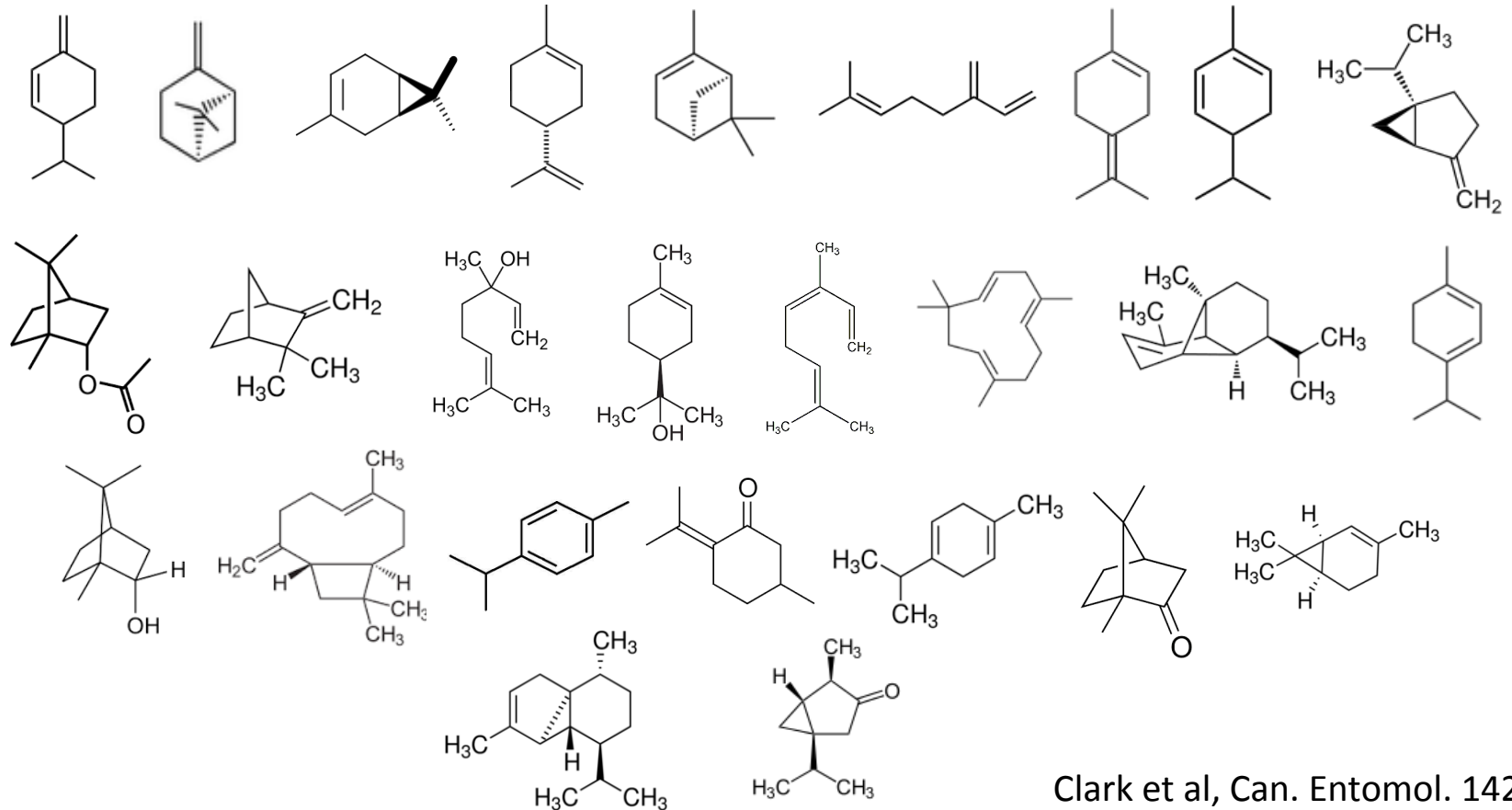
Its just carbocation rearrangement and terpenes, Seymour

Audrey II, How are you communicating with me?

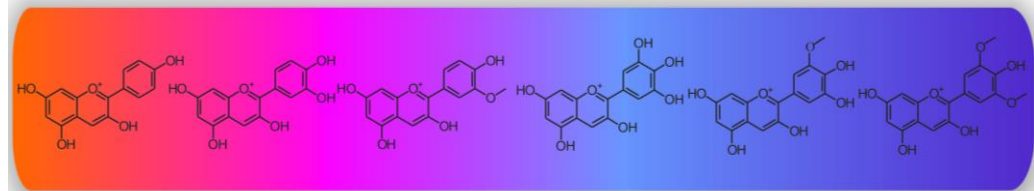
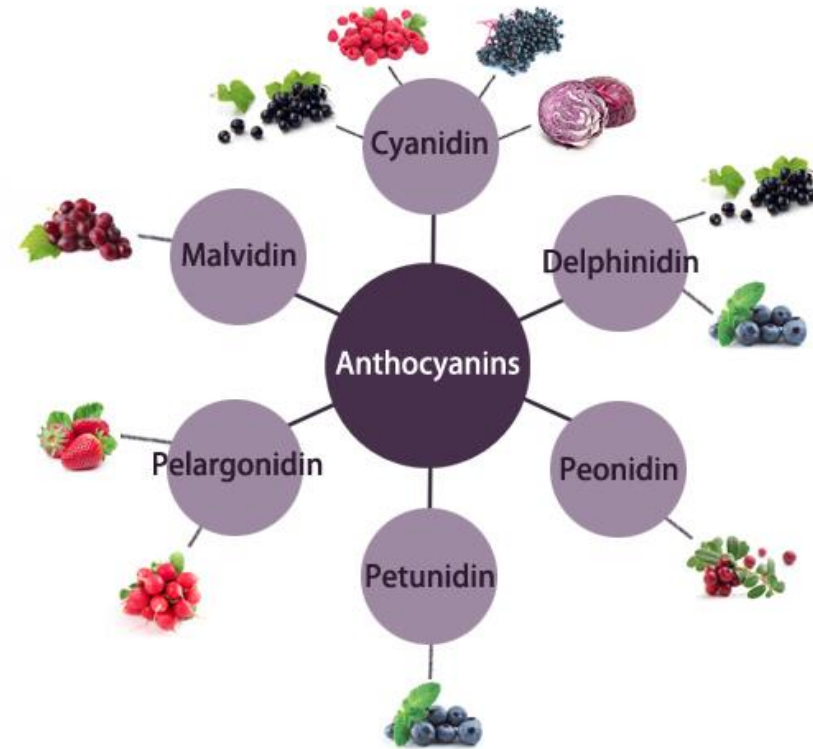
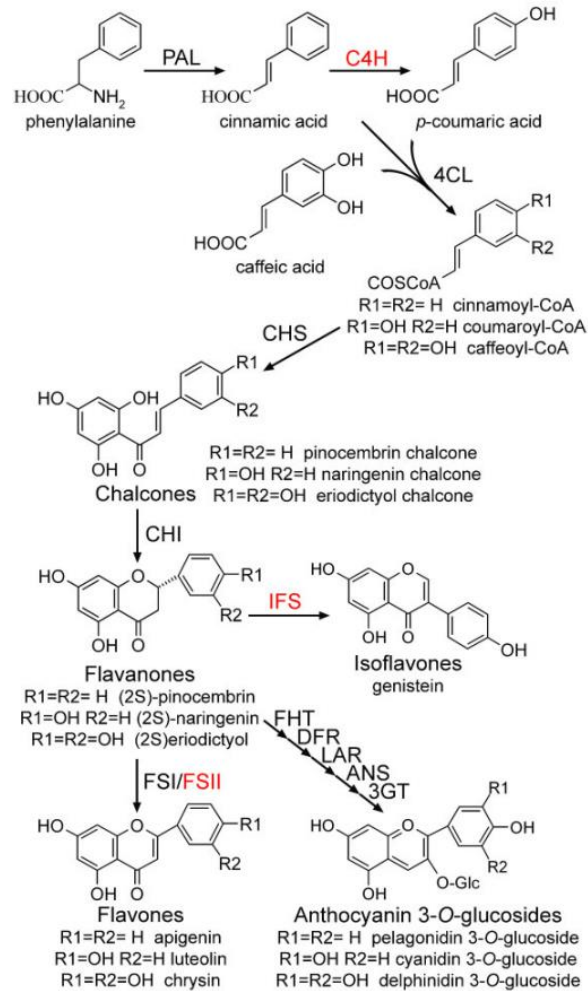
Plants are Truly Remarkable Organic Chemists!

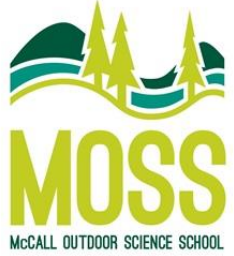


Terpenes

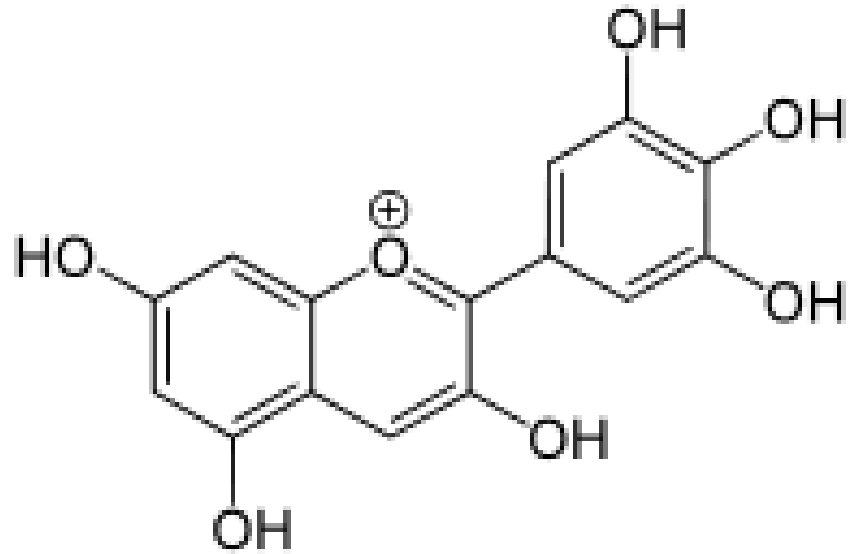


Plants are Truly Remarkable Organic Chemists!





How to do it?



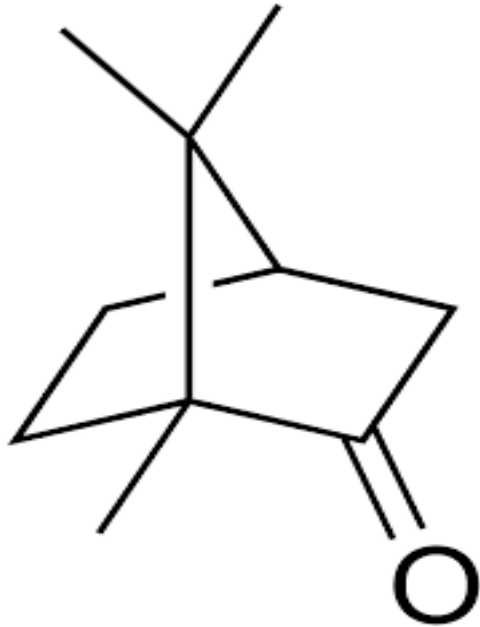
Delphinidin

Anthocyanin dye found in huckleberries



University of Idaho graduate students
Frank Church Wilderness

How to do it?



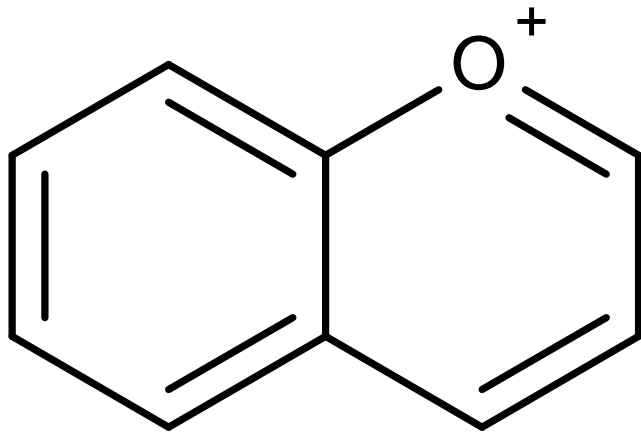
Camphor

Major volatile organic from big sagebrush

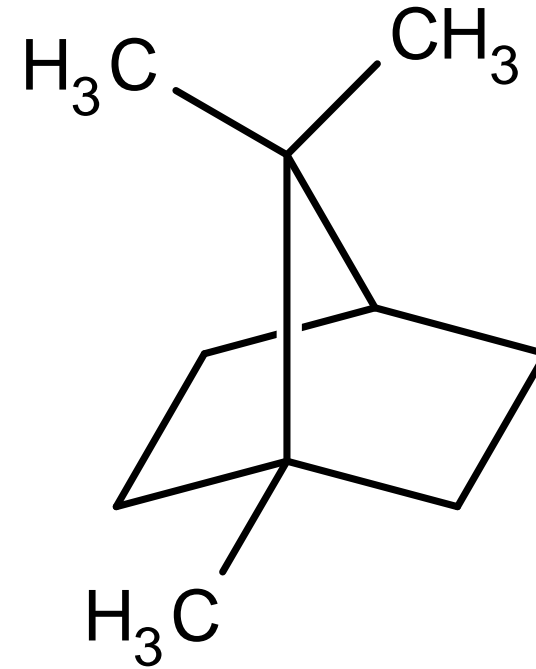


University of Utah graduate students
Centennial Valley, Montana

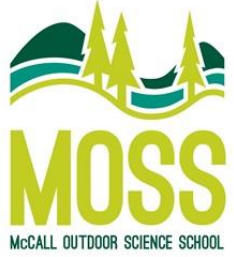
How to do it?



Color

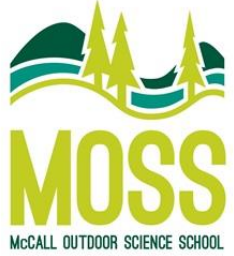


Scent



The Outcome.....



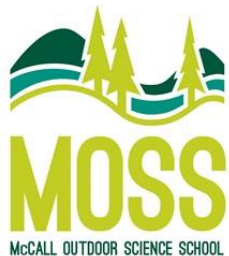


Summary

Organic chemistry is more compelling when outside and utilizing sensory experience

Native plants create a connection to place and facilitate intimacy with the natural world

When done this way anyone can do organic chemistry



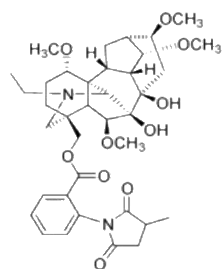
Organic Chemistry offered at the McCall Field Campus!

Chem 275/276 Carbon Compounds May 23 - June 10, 2016, McCall, ID

Come and learn organic chemistry next to Payette Lake with the spring wildflowers blooming!

This unique course offering (CH 275) will teach fundamental organic chemistry principles using the natural world as a tool to learn from. We will study plants and natural materials through the lens of organic chemistry, looking at how plants make chemicals that we smell, see and taste and analyzing these structures and compounds unique to plants. The Laboratory class (CH 276) will take place both indoors and outdoors. We will explore natural products using distillation, liquid and sohxlet extraction, chromatography and have examples of spectroscopy to guide our learning. We will also perform some chemical transformations to understand organic chemistry reactions and mechanisms.

Course Costs: Tuition - \$1404 for both CH 275 (3 credits) and CH 276 (1 credit)
Room and Board at McCall Field Campus: \$973.75



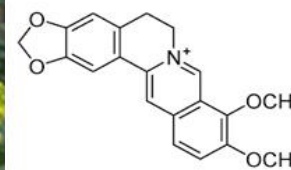
Methyllycaconitine
Poisonous alkaloid linked to cattle death



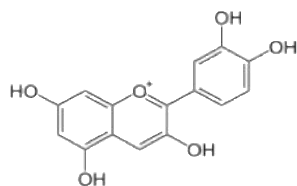
Delphinium bicolor
Low larkspur



Berberis aquifolium
Oregon Grape



Berberine
Antifungal, antimicrobial, used in chinese medicine for > 5000 yrs



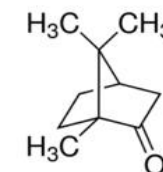
Anthocyanidin
Antioxidants, used in dyes



Rubus spp
Wild Raspberry



Artemisia tridentata
Big sagebrush



Camphor
Insect repellent, cough suppressant

In Summary



Acknowledgements

UI/CNR/MOSS

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Dr. Steve Cook
Dr. Armando McDonald
Gary Thompson

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Ellen Meloy
Dr. Ted Bartlett
Terry Tempest Williams
Brooke Williams

