Newsletter

Cowichan Valley Rhododendron Society Volume 29:1 February 2018

President's Message

As we go rushing into the New Year, or as it goes rushing past us, the winter season does give us some time to reflect on the past year.

Already the plans are developing. Clean out a new bed to ready it for those fabulous rhododendrons you saw in the last talk at the club. Move such-and-such-a-plant in the dormant season, now made more difficult by the fact that it is an herbaceous perennial that you forgot to label and cannot distinguish from the herbaceous perennial weeds. I am sure many of us are now pondering changes to make in the garden and within ourselves.

***Magnolia sieboldii* in Joe and Irene Hudak's garden in end of May 2017**
Photo by Verna Buhler

CVRS First Meeting of 2018!
EXPERT PANEL
Wed, Feb. 7 @ 7:30pm
(More details on page 3)

In This Issue:

To that end, I have compiled a list of New Years Resolutions, a Gardener's Guide to a better garden life, as it were. Those who are organized and have the next moves planned, whose gardens are clean, tidy, and mulched; whose tools are cleaned, sharpened and hanging expectantly in the garden shed, probably need not read further. As for the rest of us…

1) I will deal with the weeds when they are in their infancy, and not wait until the cat goes missing for three days in them.

2) I will clean, sharpen, and oil my tools at the end of the season, and not leave the trowel sticking out at a jaunty angle in the dead geranium at the door.

3) I will look into the technological logistics of creating a "Find My Trowel" app, similar to "Find My Phone", although I imagine a metal detector would do the same thing and I might even find buried treasure!

4) I will not admire the snow building up a lacy network on groaning and bending branches saying "Isn't that pretty?" but straight away will seize a broom and go forth to clean them off.

5) I will label plants as they flower, instead of waiting until the flowers are nothing but a brown fading memory.

6) I will label new plants as I plant them, and not promise to do it later. (I think I have already established what my promises are worth)

7) I will not withhold water until the poor leaves curl up, and the entire plant starts drooping in anticipation of incipient death. I will monitor soil moisture and apply accordingly. (However, I must say I was surprised at how little water the Camellia required and how it stood up to the dry treatment)

Thank you to Barrie, a fine baker, for creating an inspirational sunflower feast for us in the middle of winter

8) I will apply fertilizer in the early spring, and not wait until the plants take on a jaundiced air and glare disapprovingly at me as I wander past.

9) . . .?

I can't remember the 9th one, but I think that is enough for now. Too many and I won't keep them anyway; so for now, I will settle in front of the fire with a glass of wine, and dream about the season to come. It is not far away.

Barrie Agar, President

First CVRS Meeting of 2018!

EXPERT PANEL

Wednesday, February 7; 7:30 pm

Ken Webb

Ken is the ARS Western Vice President and an experienced propagator, specializing in Jim Barlup rhododendrons. He offers a vast knowledge of rhododendrons, propagation, and the American Rhododendron Society. Ken and Madeline's garden is located in Saanich, on Vancouver Island. Apart from developing their beautiful garden, Ken and Madeleine have propagated enough plants to adorn the Saanich Peninsula, as well as a broad sweep of Vancouver Island with rhododendrons. The Cowichan Valley Rhododendron Society has often been the beneficiary of his largesse. We are most fortunate to have his expertise available to us.

Rose Rogan

Rose is a member of our club and is the proprietor of Perennial Ridge Farms, specializing in deciduous azaleas and rhododendron hybrids. Rose is renowned for the quality of her rhododendron and azalea plants, and is expanding her nursery business. Many of us have plants from her nursery growing happily in our gardens. Her property in the Cowichan Valley reflects her creativity in garden design, and her down-to-earth passion for both plants and animals, particularly dogs and poultry, as well. Rose will be happy to answer our questions, and we will benefit from her knowledge of the local region with its various growing environments and conditions.

Please come prepared with your questions…….

Rose, do you use organic fertilizer, provided by your Andalusian Blues, on your rhododendrons?

Glen, I have been keeping my eyes open for a true blue vireya; what are my chances of finding one of these? Could I cross between R. augustinii and a white vireya?

Garth, what type of mycorrhizae have you found in your garden around your rhododendron plants? Have you found other companion plants that seem to be rather dramatically drawn toward rhododendron roots when they could have spread to other areas nearby?

Ken, do you propagate R. 'Muncaster Mist'? Is there a secret to that?

Also, why do some of the leaves of my cuttings, given the very same start and care as others, just seem to dry up and fall away. Should I leave these to see if more will happen below the ground, or is the process over for them?

Garth Wedemire

Garth is no stranger to the club. He has regaled with stories from his plant hunting in Nepal and China, and has visited many gardens throughout the world. He is also a board member of the Rhododendron Species Foundation. Garth has seen many of our treasured rhododendrons growing in the wild and will share his stories and experience. He is an avid photographer.

"*The fog misted the view of the Himalayas as they trekked up and down, having to back track because of a washed out bridge and frightening landslides. One attribute needed in abundance was bravery!! In all, they found four rhododendron species, but they saw* ***arboreum*** *in multitudes, all in full bloom in the canopy, painting the mountainsides pink, red and the occasional 'alba.' Among these stood* ***R. companulatum****,* ***R. barbatum*** *and the small alpine* ***R. keleticum****, plus glorious magnolias,* ***M. soulangea*** *and* ***M. napaulensis****. Some Cobra plants peered through in cool spots;* ***Arisaema nepenthoides*** *stood sentinel beside the trails. When the mist cleared and Garth used his telephoto lens, it was truly a Rhododendron Heaven"* (drawn and adapted from an article, *Victoria Rhododendron Newsletter September 2004)*

Glen Jamieson

Glen is the Editor of JARS, the Journal of the American Rhododendron Society and an expert on Vireya Rhododendrons. Although the Vireyas are more of a subtropical plant, it is still possible to grow them here with some protection. He too, has participated in numerous plant exploration trips: Yunnan, China (2005); Borneo (2008); Ecuador and Peru (five trips between 2008-2014) and in Sikkim, India (2015). He has travelled extensively elsewhere as well. He and his wife Dorothy live in Parksville, and maintain a garden that is periodically on the Mt. Arrowsmith Rhododendron Society (MARS) garden tour. Glen can provide descriptions of rhododendrons in their native habitat, offer tips for growing Vireyas, and provide valuable pointers on growing plants more accustomed to our northern climes.

Letter *from the Editor*

It has been a while since we have gathered and spoken about rhododendrons; I have missed that, and am looking forward to seeing you all soon. No doubt all of us have been doing our own reading and research, and have discovered many articles suitable for sharing with fellow members by means of our newsletter. Let's remember to forward these discoveries to the editor!

For some time now, a topic on my list for just such personal research is that of *"the role of **mycorchizae** in rhododendron growth"*. It was something that I should have taken time to understand long ago when I first bought a product called ***Myke*** to use with new shrub plantings. I was told that it did work very well, but not for propagating arbutus trees. That wasn't my purpose at the time, so I tried it. When I decided to move some of my newly planted shrubs after only a few weeks---a relatively bad habit of mine---I found that the shrubs where I had used the product had surprisingly beautiful roots. When I ran out of the product, I thought I would eventually buy some more, or at least find out what the "magic" factor was. Then fall and winter arrived, career demands took charge, and I forgot about it altogether, for years, in fact.

Mt. Baker from Jitka's Bench on Mt Tzouhalem. Sometimes when it's too cloudy in the valley we can hike high enough to reach some sun!

Spring arrives in George's garden May 2017
Photo: Verna Buhler

Mycorrhiza has been on my mind this last year, so I finally did some reading: just enough to make me an inadequate expert on a very tiny portion of a complex topic. In our February newsletter you will find an introductory article on ***mycorrhizae,*** and a few clippings on the same topic from other sources.

Of course, it is always special to slip along with some our friends as they visit gardens while on special vacations. Sandra has invited us to join her in Amsterdam this month, so enjoy the "Hofjes" and the canals!

Hopefully this newsletter will provide a bit of inspiration as you prepare for the miracle of spring in your gardens.

Verna Buhler

CHRISTMAS SPIRITS

Shared on December 3rd, 2017

WINNER – Silver Bowl Award

The Silver Bowl Award most deservedly awarded to Roy Elvins for his outstanding contribution to the Cowichan Valley Rhododendron Society

WINNER – Annual Photo Contest

Two fabulous photos (top, from left to right) of *R*. cinnibarinum, *R*. 'Starbright Champagne', *R*. cinnibarinum, *R*. 'Glory of Littleworth' all by photographer, Alan Campbell, took first and second place awards. (The bumblebee on *R*. 'Fantastica' photo did not win)

WINNERS of the Tall Tale Contest

Clearly all three contestants were winners. If any of us doubt, that we should just try to do what they did next year! Shirley admitted to the fiction factor and won. Sharon refused to admit hers was "false news" and yes, didn't win.

Ian, story-teller with a smooth style, and just shy of first place, tucked under a red hat every time the camera focused on him.

Enjoy another contest! Match the captions to the photos:

"Yes, we are Kennedy #1 and Kennedy #2. We're new!

"How lovely! We really shouldn't cut into the other one!"

"Yep, I got some before the raptors set down!"

"Hi New Members! Do you mind if I join you, my old friends?"

"We are all paying attention--- to someone! Some are more interesting than others."

"Nice print. I think I would like to win that raffle prize."

"I have all the winning tickets right here---red tickets are the lucky ones."

"Relax and enjoy the meal --- worry about the raffle later. We've gone green, and we are ready too."

"Yes, I'm both a photographer and a story-teller and most capable of winning!"

"Were you thinking of sharing with Ali or with me?"

"Well, I might be new to a few of you, but just to some of you chatty ones."

Amsterdam - Part II of an European Adventure

Article and Photos by Sandra Stevenson

In June 2017 on our way to Northern France we spent five days in Amsterdam. I will share a few photos taken while wandering the streets of the city.

Everywhere you look in Amsterdam is a feast for the eyes. The five-story half-timber frame buildings lean to the right, left and forward all at the same time. If I hadn't learned of the history of half timber houses having had their upper stories built a bit larger than the first, having deliberate overhangs and leans to combat water damage on the lower levels, and providing a greater square footage of living space on the upper levels, I would have thought they were built by novice carpenters. They stand in row upon row along tree-lined canals and appear to defy gravity. The bridges and canals throughout Amsterdam are cause for a photo-op at every corner. You must pay close attention when seeing the sights not to be run down by the thousands of bicycles that cycle the 400 km of bike paths throughout the city.

Hofjes

A fifteen-minute train ride west of Amsterdam brought us to the medieval city of Haarlem. Of great interest were the Hofjes we had an opportunity to visit. Hofjes are hidden gardens tucked away in small, protected courtyards surrounded by Almhouses.

This form of social housing began in the 13th century and was possible because of generous bequests by wealthy men or women. Most often, and following strict criteria, the housing was provided to low-income people. Widows and single women were the beneficiaries of this protected living arrangement in the early years. It was said, “that only women were accepted as they could be trusted to run their own household properly”. In later years impoverished single men also were accepted as candidates for housing.

Historically the small courtyard garden spaces were used as community kitchen gardens and there would have been a communal water pump available in each garden. Some Hofjes continue to operate with boards of regents as they have for hundreds of years, though most now receive their income from renting the apartments out.

Often the entrances were not obvious and required some fancy map reading to locate. The entry may be a gate, or a doorway built into a stone wall, or a lovely sitting room in a building with hallways to guide you through to this hidden oasis of peace and quiet.

All had a unique style of gardens and were immaculately maintained. Some presented a more formal style and many exhibited relaxed plantings with ornamental shrubbery, perennials and flower gardens. Once discovered, these secret gardens all provided a sense of solitude in the middle of the city and made for a delightful day while taking in the sights of Haarlem.

Request to Members:

A small reminder and very special request

Please kindly and generously pot up your seedlings and divisions as you garden this spring.

Ideally your plants will have opportunity to settle in and establish new growth well before the Plant Fair in April.

Thank you so very much!

Bearded Iris in Joe and Irene Hudak's garden at the end of May 2017

Photo: Verna Buhler

Mycorrhizae

*This portion of an article from **"Natural History of Fungi**", written by David Malloch, was drawn from the **Mycology Web Pages, New Brunswick Museum***

Mycorrhizae (singular: ***mycorrhiza***) are mutualisms formed between fungi and plant roots. The importance of mycorrhizae cannot be overstated; it has been suggested that as many as 95% of all the world's plant species form mycorrhizal relationships with fungi and that in the majority of cases the plant would not survive without them.

Ericoid mycorrhizal fungus

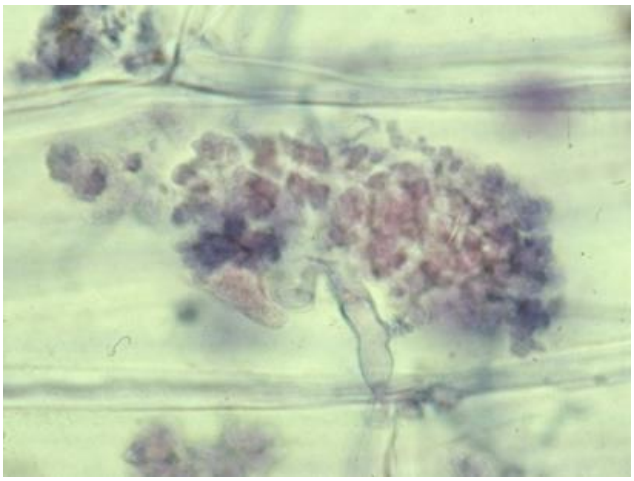
Mycorrhizae have existed for a very long time and can be demonstrated in the fossilized roots of some of the earliest land plants. They can be found in plants growing in habitats ranging from humid to dry tropics all the way to the far north and south. Some scientists have suggested that plants were only able to move on to land when they had developed mycorrhizal relationships with fungi.

Mycorrhizae are considered to be a mutualistic relationship because both organisms benefit. The fungus receives the products of photosynthesis from the plant and is thus freed from the necessity of finding its own sources of energy. At the same time the fungus grows out into the soil and retrieves nutrients, especially phosphorus and nitrogen, and passes these back to the plant. Numerous experiments have shown that plants without mycorrhizae cannot cope as well with low mineral levels as those that have mycorrhizae.

It is generally believed that mycorrhizae have been re-invented many times over the history of land plants. Many different groups of fungi are involved and the form of the actual fungus-root interface, the mycorrhiza itself, varies greatly. Scientists recognize several distinct types of mycorrhizae and can relate these to particular groups of plants and fungi. The most thoroughly studied of these types are ***arbuscular mycorrhizae, ectomycorrhizae, ericoid mycorrhizae, arbutoid mycorrhizae*** and ***orchid mycorrhizae***

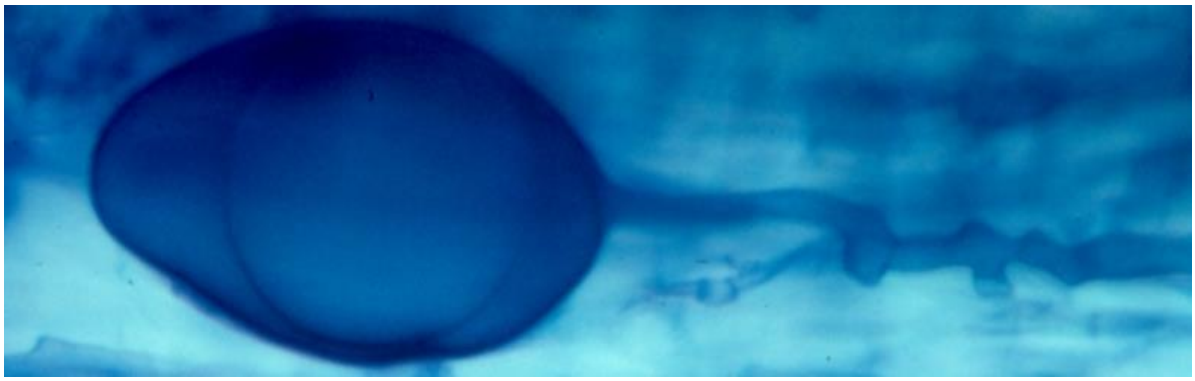
Arbuscular mycorrhizae:

Arbuscular mycorrhizae (often called ***AM***) are the most common and widespread of all mycorrhizae and are found in as many as 85%-90% of the world's plant species.



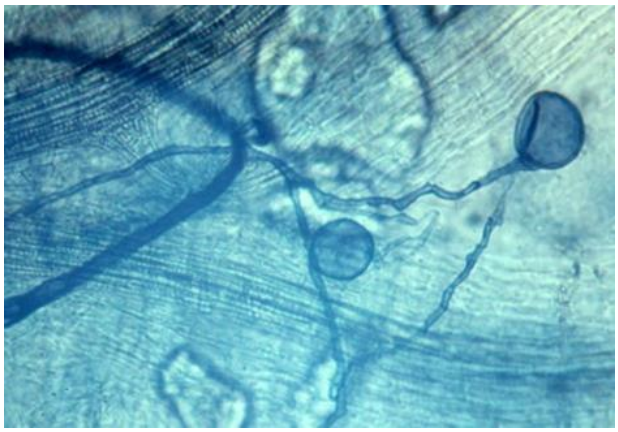
In this association the fungus occurs *inside* the cells of the plant root as a highly branched shrubby structure called an ***arbuscule***. The picture at right shows an arbuscule of one of these fungi inside a root cell of a small onion plant. To view this fungus, it was necessary to clear all of the contents out of the root cells with hot potassium hydroxide followed by a blue dye called Trypan Blue. The cellulose of the root tissue did not stain very much while the wall material of the fungus, possibly chitosan, stained purple. Although it appears that the arbuscule fills the root cell, it actually occurs between the root cell wall and the cell membrane within. The cell membrane fits over the arbuscule like a rubber glove over one's hand. Thus the

fungus never comes into direct contact with the root cell nucleus, mitochondria or other cell structures. The exchange of nutrients between the two partners, minerals from fungus to plant and sugars from plant to fungus, takes place at the cell membrane-arbuscule interface.



Fungi forming arbuscular mycorrhizae may produce some other structures in addition to arbuscules. Roots harbouring arbuscules may also contain balloon-like structures called ***vesicles*** as illustrated above in the root cells of the same onion shown previously. Vesicles are very commonly produced by these fungi; so often, in fact, that they have been referred to as ***"Vesicular-arbuscular Mycorrhizae (VAM)"***, particularly in the older literature. However, that name is unnecessary because these fungi nearly always produce arbuscules but may often lack vesicles.

The fungi forming arbuscular mycorrhizae not only occur in roots but also extend out into the surrounding soil where they form a dense network. It is this so-celled ***extra-radicular phase*** that is responsible for extracting nutrients from the soil. The ***hyphal*** network is relatively long-lived and is able to colonize new roots as they enter its domain. One of the criticisms of soil tilling, a common agricultural practice, is that it breaks up these mycorrhizal networks and prevents germinating seeds and young plants form tapping into existing systems of nutrient uptake.

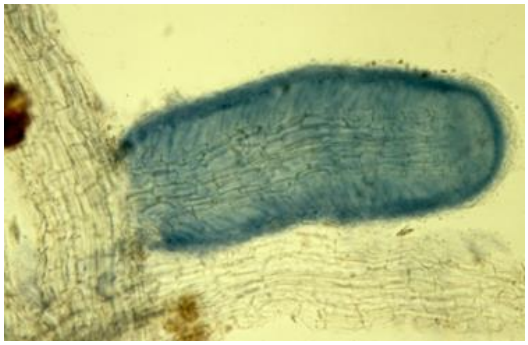


Reproduction of the fungi forming arbuscular mycorrhizae is by thick-walled spores produced on the extra-radicular hyphae. These are thick-walled and often remain in the soil for long periods. Many are quite large and can be recovered by sieving the soil. Although these spores will germinate and produce hyphae in the laboratory no one has yet succeeded in growing the fungus independently of a root. The picture at right shows spores of a species of ***Glomus*** produced on a branched extra-radicular hypha.

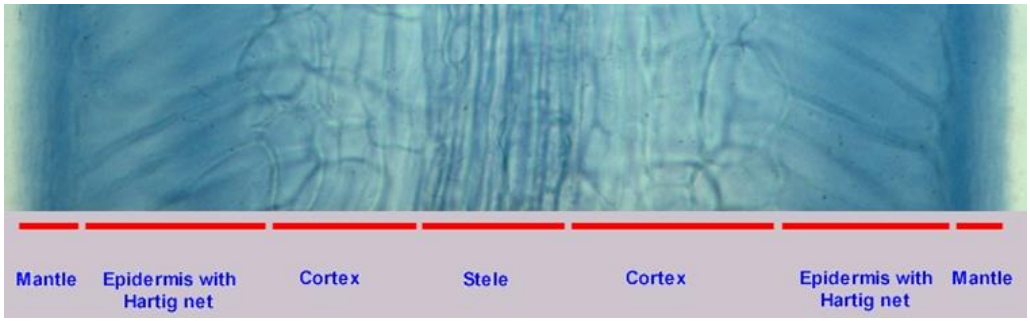
The fungi able to form arbuscular mycorrhizae are relatively few in number and all are members of their own phylum, the ***Glomeromycota.*** Although the root system of a plant might support several species of these fungi, the diversity is never great. In fact some species appear to be common throughout the world, in spite of immense climatic and floristic differences.

Ectomycorrhizae:

Ectomycorrhizae, sometimes abbreviated as ***EM***, are not as widespread in nature as arbuscular mycorrhizae, occurring on the roots of about 5% of the world's plants. The most diagnostic feature of ectomycorrhizae is that the fungus never penetrates the cell walls of the plant and thus the exchange of nutrients must take place not only through the cell membrane but through both plant and fungal cell walls as well.

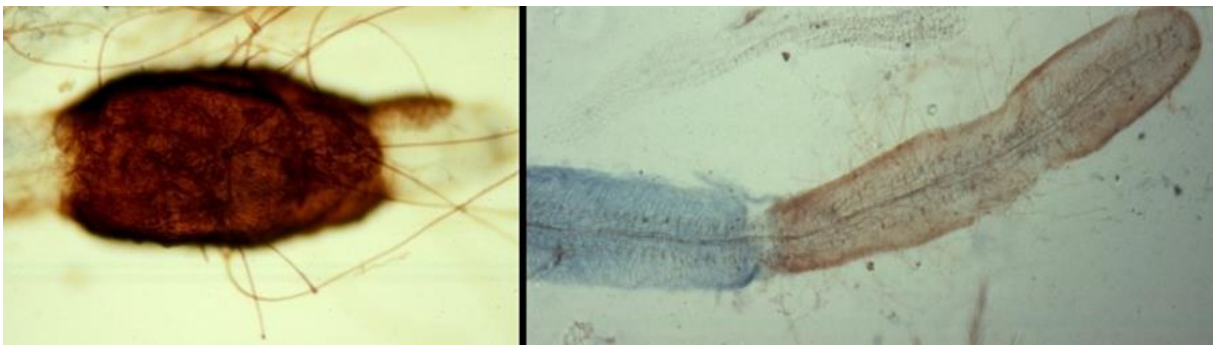


A young root of paper birch is shown in the illustration at right. It was stained with Trypan Blue as outlined above and shows an older section uncolonized by fungi and thus unstained giving rise to a new branch that has become heavily colonized. The outside of the root is ensheathed in a thick covering of hyphae called a ***mantle***, visible in the picture as a dark blue border around the root. The mantle is outside the root and can often be removed as though it were a shell. It completely isolates the root from its environment so that all substances coming into that root must come from the fungus. Inside the mantle is a single layer of cells forming the ***epidermis***, the outermost tissue of the root. In paper birch and several other species the epidermal cells become elongated and slanted to form a herringbone pattern following fungal colonization. Below the epidermis is a layer of cells forming the ***cortex*** of the root. The cortex varies in thickness according to the species of plant, ranging from one to several cells deep. The colonizing fungus grows between the cells of the epidermis, and often the cortex as well, and surrounds the individual cells, finally isolating them from one another. This network of enveloping hyphae surrounding epidermal and, often cortical, cells is called the ***Hartig net*** in honour of the nineteenth-century German biologist Robert Hartig who first observed it. The Hartig net is the interface between the fungus and the plant; it is the site of all nutrient and water exchanges between the two associates. Although the Hartig net surrounds the plant cells they do remain in contact with one another through microscopic strands called ***plasmodesmata.*** The centre of the root is taken up by the ***stele,*** the conducting system of the root. Water and nutrients passed by the fungus to the root are transported throughout the plant via the stele, itself composed to several parts.



The picture at right illustrates these relationships more clearly. It presents a narrow strip across a mycorrhizal root of ***Populus tremuloides***, the trembling aspen. Comparing this picture with the one above of paper birch you can see that the root tip would be at the bottom of the page. At this higher magnification the compactly arranged hyphae of the mantle can be seen as well as the hyphae of the Hartig net surrounding the slanted epidermal cells. The cortex can be seen to be made up of more or less round cells while the stele is clearly formed of elongated cells. In the aspen and birch roots, the Hartig net extends only into the epidermis, but in other species, white spruce for example, the cortex may also become involved.

The location of the fungus within the root is under the control of the plant, which uses toxic ***phenolic compounds*** to limit growth of the hyphae. This can be observed in laboratory experiments where the same species of fungus is introduced into the roots of two species of plants; in one it may extend down into the cortex, while in the other it may be restricted to the epidermis.



Unlike the fungi forming arbuscular mycorrhizae, those forming ectomycorrhizae are exceedingly diverse. Several thousand species of these fungi are known and many are undoubtedly still waiting to be discovered. With such a diversity of fungi on hand, the root systems of large ectomycorrhizal plants may support dozens of fungal species. Moreover, at least once, and possibly more times in a year the root grows out from its mycorrhizal sheath and must be recolonized. The picture at far left shows an aspen root growing out through the end of a mycorrhizal sheath, probably produced by the fungus ***Cenococcum geophilum.*** Although a little out of focus you can see that the emerging root tip is uncoloured and unstained, indicating that it was yet to be colonized. The picture in the right panel shows an aspen root that has had three such growth spurts: the first of these resulting in colonization by a lightly staining but originally colourless fungus, followed by two additional colonizations by a brown fungus. It appears that the root was orginally colonized by the blue-staining species but that this was replaced by another species following a growth spurt. The third growth spurt simply resulted in recolonization by the brown species. These events suggest that as a root grows it may continue to associate with one species of fungus but it also has the opportunity to change partners. Numerous studies have shown that ectomycorrhizal fungi differ greatly from one another in their physiology and it is tempting to think that as a root extends out through the soil it is able to form an association with a fungus appropriate to the particular conditions it encounters.

The ability to form ectomycorrhizae is found in many families of fungi, but most commonly among members of the class ***Agaricomycotina*** of ***the Basidiomycota***, especially those producing mushrooms and boletes. Most of the larger mushrooms you see in the forest have arisen from the networks of extra-radicular hyphae permeating the soil beneath your feet. The abundance of these mushrooms, their sheer weight and volume, attests to the magnitude of their activities. The energy and chemicals needed to build these mushrooms comes in great part from the trees, suggesting that the advantages a plant gains from mycorrhizae come at a cost.

Most plants exclusively form arbuscular mycorrhizae but there are compelling reasons to focus attention on those having ectomycorrhizae as well. Although a smaller number of species are involved, ectomycorrhizae dominate in the pine, oak, birch, willow, walnut and several other families. In the tropics these include the ***dipterocarps*** and large woody legumes. In New Brunswick our extensive forests of spruce, fir, white pine, birch and poplar support immense continuous networks of ectomycorrhizal fungi. Without these fungi our forests as we know them would not exist. Thus the ecological and economic importance of ectomycorrhizae cannot be overestimated.

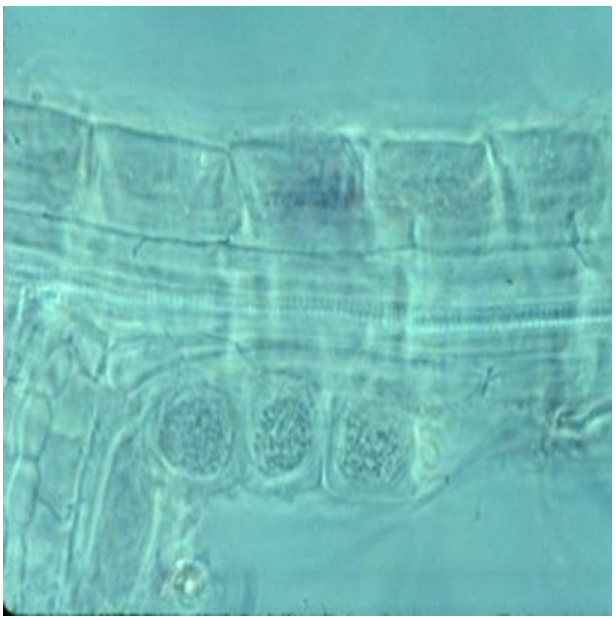
Many biologists have noted the major differences between tropical and temperate forests and have attempted to relate these to dominance by certain mycorrhizal types. The pictures above illustrate two such forests; at left a tropical rain forest in northern Costa Rica and at right a forest near Schefferville, Quebec. The Costa Rican forest is dense and made up of a great variety of tree species. You might walk some distance through this forest before encountering two individual trees of the same species. Biodiversity here, including the trees, seems to be high. On the other hand the Quebec forest appears to have only one kind of tree. Closer examination would reveal some four or five species but hardly more. If you started walking away from the base of a spruce tree it wouldn't be long before you encountered another. Biodiversity here seems to be very low. Curiously, fungal biodiversity in these forests takes another form, at least when it comes to mushrooms. Few trees in the Costa Rican forest are able to form ectomycorrhizae, while in the Quebec forest all the trees form ectomycorrhizae. As a result of this, the Quebec forest will have a great variety of large mushrooms while the tropical one will support a lessor variety of mostly small mushrooms.

Other kinds of mycorrhizae:

Although arbuscular and ectomycorrhizae account for most instances of mycorrhizae there are some other more specialized types. These are all restricted to a single plant family, or a closely related group of families, and are not as commonly encountered as the two main types. However, in New Brunswick we are fortunate to have these other types of mycorrhizae and can observe them during the active growing season.

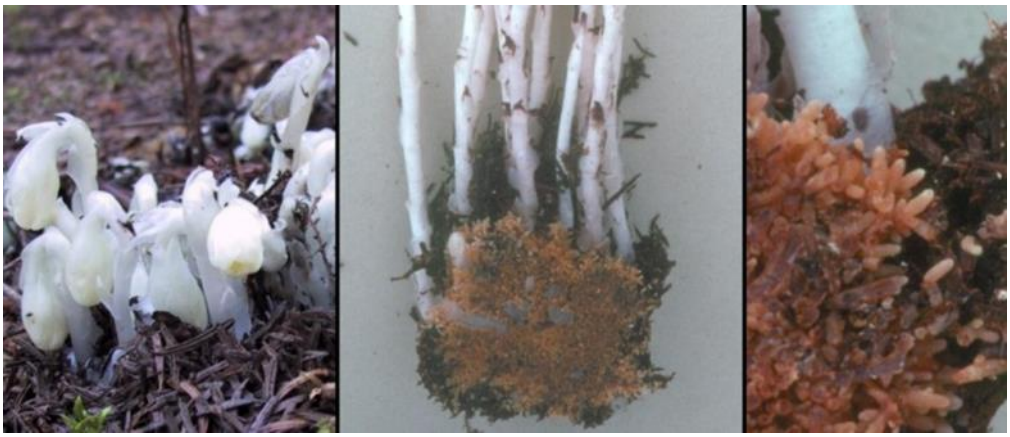
The most widespread of the "minor" groups of mycorrhize are ***ericoid mycorrhizae***, so named because they are restricted to the Ericaceae, the heath family, and some closely related families. The Ericaceae are familiar to New Brunswickers in the form of blueberries, cranberries, sheep laurel, rhododendron, etc. Crowberries, in the related family Empetraceae, also have ericoid mycorrhizae.

The picture at right shows a root of ***Labrador Tea***, (***Rhododendron groenlandicum)*** another member of the Ericaceae common throughout New Brunswick. Compared with the birch and aspen roots those of Labrador tea appear to be lacking some tissues, but in fact everything is there. These roots are exceedingly thin and often called "hair roots". If you attempt to pull one of these plants out of the soil without loosening the roots first with a shovel or trowel you will leave all of the hair roots in the ground. In the picture there appears to be only a cortex and a stele but there is also an inconspicuous epidermis that didn't show up very well in the photograph. The cortex is only one cell thick and these cells are packed with fungal hyphae. In many ericoid mycorrhizae the fungus may actually outweigh the root! Such a root is little more than a receptacle for holding a fungus. Although the hyphae appear to fill the cortical cells they are outside the cell membrane, which is intricately wrapped around them. Nutrient exchange between the fungus and plant takes place at this interface and is extremely efficient.



The plants forming ericoid mycorrhizae are highly adapted to this association and, not surprisingly, so are the fungi. These fungi, most commonly the **inoperculate discomycete *Rhizoscyphus ericae*,** have highly developed abilities to extract nutrients from nutrient-poor soils. Hence members of the Ericaceae are able to grow in such places as bogs and sandy areas that would be unavailable to most plants.

Arbutoid mycorrhizae also occur in the Ericaceae but only on a few species, mainly those of ***Arctostaphylos*** and ***Arbutus***. ***Arctostaphylos uva-ursi***, or bearberry, is the only representation in New Brunswick and it is not very common, although it is abundant to the north and west of us. Arbutoid mycorrhizae are similar to ericoid mycorrhizae in having the cortical cells filled with hyphae but differ in having a mantle as in ectomycorrhizae. The fungi involved are apparently ones that also commonly form ectomycorrhizae.



Monotropoid mycorrhizae resemble arbutoid mycorrhizae in many ways but differ in the appearance of the roots and in the nature of the mutualism. In the pictures above, all of Indian pipe, ***Monotropa uniflora***, we see, at left, the above-ground part of the entirely white plant. The picture in the middle shows the base of the stems, including the underground root mass, and the one at right provides an enlarged view of the roots. Indian pipe is common throughout Canada and lives as a parasite. Until fairly recently it was believed that this plant attached itself to the roots of other plants where it would absorb their nutrients. Its lack of chlorophyll suggested that it had no existence independent of its plant host. More recent studies have demonstrated that Indian pipe and some other related plants actually tap into the extra-radicular hyphae of fungi forming mycorrhizae with neighbouring trees and incorporate these into their own dense, concentrated mycorrhizal systems. From these mycorrhizae the plant can drain sugars and all the other nutrients it requires. From this we see that Indian pipe is not really a parasite of plants but of mycorrhizal fungi.

Orchids form their own kind of mycorrhizae, often for complete nutrition including sugars. Many orchids are without chlorophyll when young. Others lack it throughout their lives. The use of mycorrhizae to offset this lack of chlorophyll is similar to the situation in Indian pipe. The mycorrhizae themselves are similar to ericoid mycorrhizae, although the roots are larger and the colonization less extensive. The fungi involved in orchid mycorrhizae are interesting in that they are close relatives of fungi causing plant disease. Mycorrhizal fungi in other groups are not closely related to parasitic groups and would present no threat to the plant.

Nina Wurzburger (now of Princeton) and Ronald Hendrick of the University of Georgia collected data on nitrogen (N) levels in the soil and in the roots of plants in a southern Appalachian forest, including rhododendrons, hardwood trees and herbs. Rhododendron leaves are rich in tannins, and when their leaves drop and decay, they enrich the surrounding soil with tannin complexes. The researchers found that when these tannin complexes were present, there was a lot more N in the soil. Further, rhododendron roots were found to absorb more N than surrounding trees or shrubs.

The researchers think that leaves dropped by rhododendrons have properties that package N in ways that make the nutrient more accessible to the rhododendron than to surrounding plants. So when the leaf decays into the soil, it makes the soil less amenable for N uptake in other plants. Further, the mycorrhizae that live on rhododendron roots have specialized ways to absorb N within these complexes, which might include the shape and length of the roots and other specialized ways to extract N from organic matter.

This tightly-knit feedback loop might help explain why rhododendron has expanded so broadly in the southern Appalachians and has had detrimental effects on forest diversity. As the authors conclude:

“Feedback processes between plant litter chemistry and mycorrhizal roots and fungi may be highly complex and occur at fine spatial scales, but they have the potential to drive patterns in N cycling and productivity in terrestrial ecosystems.”

Wurzburger, N., & Hendrick, R. (2009). Plant litter chemistry and mycorrhizal roots promote a nitrogen feedback in a temperate forest *Journal of Ecology, 97* (3), 528-536 DOI: 10.1111/j.1365-2745.2009.01487.x

Rhododendron Species Botanical Garden

Annual Symposium

April 6 & 7

Everyone Welcome!

Location: Best Western Plus, Federal Way,

WA and Rhododendron Species Botanical Garden

Featured Speaker: William McNamara,

Executive Director of Quarryhill Botanical Garden

Information & Registration: www.rhodygarden.org

Early bird registration is now

through March 9th ($125.00)

253-838-4646 x 140

Calendar of Upcoming Events

February 15; 2pm
CVRS Book Club Meeting
CVRS Library situated at Verna and George's

February 15; 7pm
CVRS Plant Fair Planning Committee Meeting
Verna Buhler's at 3908 Cowichan Lake Road

March 3 ; 1-3pm
Dig into Spring with Master Gardeners
Oliver Woods Community Centre, Nanaimo, BC
More details on page 13

March 10; 10-2pm
Seedy Saturday
Cobble Hill, BC

April 6 & 7
Rhododendron Species Botanical Garden
Annual Symposium
Best Western Plus, Federal Way
WA and Rhododendron Species Garden
More details on page 20

April 28; 10-2pm
Cowichan Valley Garden Fair
Mellor Hall, Cowichan Exhibition Park

May 20 – 27
ARS Convention
Bremen, Germany

Seedy Saturday Events

Qualicum Beach Seedy Saturday
Saturday February 3, 2018; 10 to 3:30
Qualicum Beach Civic Centre, 747 Jones St
(Speakers: Donna Balzar, Kathy Claxton)

Salt Spring Island Seedy Saturday
Saturday February 10, 2018
Salt Spring Island, BC

Victoria Seedy Saturday
Saturday February 17, 2018; 10 to 3:30
Victoria Conference Centre, 720 Douglas Street
(18 Educational Speakers)

Comox Valley Seedy Saturday
Saturday March 3, 2018
Florence Filberg Centre in Courtenay.
(Des Kennedy speaking in the morning
"Becoming a seed extremist.")

Nanaimo Seedy Sunday
Sunday March 4, 2018; 10 to 3
Nanaimo District Secondary School @ 355 Wakesiah Avenue Nanaimo (corner of Wakesiah and 3rd)

Cobble Hill Seedy Saturday
Saturday March 10, 2018
Cobble Hill Hall, 3550 Watson Avenue

Cowichan Valley Seedy Sunday
Sunday March 18, 2018; 10 -2
Si'em Lelum Gymnasium, 5574 River Road, Duncan

Campbell River Seedy Saturday
Saturday March 24, 2018; 9 am to noon
Campbell River Community Centre
401-11th Avenue

Dig Into Spring

With Master Gardeners

Featuring horticulturist

Egan Davis:

"What wild plants and their growth habits can teach the home gardener"

March 3, 2018

Master Gardeners Association of BC

Oliver Woods Community Centre, 6000 Oliver Road, Nanaimo, BC
March 3, 2018, 1:00pm – 3:00 pm
Public welcome: $15 at the door
Space is limited! Register by Feb. 25th jodiwalk@shaw.ca

2017-18 Executive

President: Barrie Agar
barrie.agar@shaw.ca (250) 748-2308

Vice President: Judeen Hendricksen

Past President: Carrie Nelson

Secretary: Verna Buhler
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Diane Allen, Alan Campbell, Ron Martin, Ali Morris

Convenors

Sunshine: Mary Gale

Tea: Judeen Hendricksen

Raffle: Hilda Gerrits

Club Liaison: Alan Campbell

Library: Verna Buhler

Membership Recruitment: Peter Lewis

Program Committee Co-ordinator: Alan Campbell

History: Ian Efford

Garden Tours/Trips: Al Murray

CV Garden Fair: The Team

Facility Liaison: Roy Elvins

Christmas Party: The Team

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Cowichan Valley Rhododendron Society

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http://cowichanrhodos.ca

April 2018
http://cowichanvalleygardenfair.com

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