



MONMOUTH COUNTY PARK SYSTEM GREEN HERITAGE

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RANGER DAYS

Lisa Bonelli, Asst. Public Information Officer

Rangering is the backbone of the Monmouth County Park System. This job involves an impressive variety of tasks, completed in public view and behind the scenes, 365 days a year, in all kinds of weather to keep the parks running smoothly.

Here's something you may not know, in Monmouth County our Park Rangers are "dual agents," so to speak. They patrol the parks, enforce regulations, direct traffic, respond to emergencies, and answer questions from the public. They also mow the grass, plow snow, maintain buildings/facilities and set-up for programs and events. In specific use areas, such as the marina, gardens, or parks with ponds/lakes, the Rangers are also skilled at boat handling, gardening and water rescue.

What's it *really* like to be a Park Ranger? Just look at some of what they do each day.

Patrol & Public Engagement



Park Rangers are knowledgeable about the parks and available to answer questions. They staff our campground and marina offices and drive tour wagons and passenger carts to help visitors get around.



Park Rangers open the park gates each day to greet the public and close off areas reaching capacity or requiring maintenance. They patrol the parks by truck, off-road utility vehicle, passenger cart, boat or foot and are a visible and reassuring presence for directions and assistance.



Ensuring Public Safety



Crowd management and directing traffic is a critical safety measure managed by Park Rangers, especially during busy events.



Park Rangers respond to calls for wildlife in distress as well as visitor emergencies. This Belted Kingfisher was caught in a fishing line and rescued. The injury was serious enough to require attention at a rehabilitation center, where the bird was treated and ultimately survived.



Park Rangers set up and clean up large and small events. They connect A-V and sound equipment; set up outdoor lighting, picnic tables and chairs; build stages and put up tents; move booths and bleachers, and plan out and flag parking areas.



Park Rangers enforce laws within the parks and coordinate with federal agencies and local police/EMTs. Pictured, a military helicopter lands at Thompson Park, Park Rangers assist local police with a high school DWI exercise.

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Editor/Writer: Lisa Bonelli
 Photographer: Maribeth Gardner
 Graphics: Michelle Scolletta
 Questions/Subscriptions:
 732-842-4000, ext. 4336;
 Lisa.Bonelli@co.monmouth.nj.us



Holmdel Park has one of the only remaining public sled hills in Monmouth County. Rangers prepare weeks in advance of a snowstorm to set up signs, safety fencing, hay bales and nighttime lighting. After it snows, they plow the hill to maintain mogul-free conditions and manage incredibly heavy traffic in and out of the park and on the hill itself.



Park Rangers ensure our ponds and lakes are safe for ice skating and ice fishing by twice daily inspections (drilling the ice to check for 4" minimum depth), shoveling snow and designating safe zones.

Golf Rangers

Golf Rangers staff the clubhouse where golfers sign in and the starter shed (pictured) where golfers get carts and set off. They also patrol the course; fill water stations and respond to emergencies.

Greenskeepers are a separate position, responsible for grounds maintenance; tees, greens, fairways, etc.



Greenskeepers



Golf Rangers

Grounds & Facility Maintenance



Park Rangers have landscaping expertise and keep the grounds looking beautiful year round.



Park Rangers are considered "essential personnel", when we have winter storms, they come in early to plow and shovel. In summer, they're out at sunrise sweeping the beaches.



Park Rangers install, repair and maintain basic park infrastructure such as fencing, bridges, platforms and docks. They also replace picnic tables and grills, park signs and garbage bins, etc.





Checking and maintaining all our recreation facilities for safety and replacing equipment as needed is a part of a Park Ranger's duty, as is maintaining trails.



Park Rangers are responsible for large scale clean-ups involving heavy equipment, dumpsters, teams of volunteers and tons of debris, as well as everyday maintenance.

Special Sites & Special Skills



For special projects such as digging trenches or moving boulders, Park Rangers with heavy equipment training are called in. Our Central Supply Facility and Archive, serving all 43 parks, is staffed by Park Rangers who know logistics: how to order, store and move large quantities of equipment.



At Deep Cut Gardens, the Park Rangers are specialists with tulips, roses, greenhouses and garden techniques.



Monmouth Cove Marina Park Rangers are experienced with bulkheads and docks and boats of all kinds as well as boat lifts, forklifts, and other equipment.

Ranger Training & Management



Park Rangers receive training at the County Police Academy and in the parks, covering topics such as search and rescue, first aid and equipment operation. The parks receive a new graduating class of rangers every few years and it's always a cause for celebration.



Park Managers/Supervisors and Asst. Superintendents oversee the daily tasks and work schedules of the Rangers. They handle formal inquiries, give tours, manage facilities and events, conduct inspections and implement the strict policies and procedures that govern all park operations.

Playgrounds: Then & Now

Paul Gleitz, P.P., A.I.C.P., Principal Park Planner

Playgrounds are now a part of every neighborhood park, but that wasn't always the case. They are a late 19th century invention that slowly evolved throughout the 20th century. During the Industrial Age, as American cities became intensely urbanized, slums and tenement housing proliferated. Children in these neighborhoods were often left to their own devices to survive on the streets or were forced into labor. As the Progressive Movement took hold in the US and began to press back against social ills of the time, the health and safety of children became a concern.

One early outcome was the creation of "sand gardens." Developed in Germany in the early 1880s, they followed the creation of Kindergarten to focus on childhood development and play. The first sand garden built in the US was in Boston at the Children's Mission in 1886. By the next year, there were ten sand gardens with paid supervisors in Boston, and by the end of the century there were 21.

Early Growth of Playgrounds

At the same time, outdoor gymnasiums were also being developed. The first was the Charlesbank, also in Boston, in 1881. Over the next decade many American cities followed. The combination of sand gardens and outdoor gymnasiums began a nationwide movement to create "Model Playgrounds," and this was the beginning of today's modern playgrounds.

As playgrounds spread to large urban areas, designers experimented with different ideas and levels of supervision. They incorporated year-round play with ice rinks and sledding hills, along with free-play lawn areas, bicycle tracks and water features. Childhood health and well-being improvements and reduced truancy supported the inclusion of playgrounds into school grounds.

By 1906, the Playground Association of America was founded and eventually became the Playground and Recreation Association of America, focusing on two areas:

- schoolyard playgrounds to boost physical education for students and
- municipal park playgrounds with large facilities like fieldhouses and ball fields for the general public

This second element was often managed by a Parks Commission and staffed by recreation supervisors [laying the foundation for county park systems, like this one?]



Then and Now: Chicago's Douglas Park Outdoor Gymnasium (1916) Source: Graf, John, Chicago's Parks Arcadia Publishing, 2000, p.12. Wikicommons. Modern playground of today, Turkey Swamp Park.

Playgrounds in the Monmouth County Parks

1960s – Monmouth County's first park at Shark River was started with 24 acres of surplus land left over from construction of the Garden State Parkway. Other parks soon followed. These early playgrounds featured what was popular at the time: metal and timber material, based around swing-sets and see-saws.



Turkey Swamp Park (1967)



Shark River Park (1969)

1970s – The Park System continues to grow and update playgrounds. Specialized companies dedicated to the design and manufacture of playground equipment leads to new play elements and forms.



Shark River Park (1977)



Holmdel Park (1979)

1980s – More challenging playground designs are developed with manufactured equipment and natural materials. Federal and State governments begin regulating playground equipment for safety. Consumer Product Safety Commission publishes the Handbook for Public Playground Safety in 1981.



Holmdel Park (1985)



Thompson Park (1988)

1990s – The Park System invests in much larger play systems and manufactured playgrounds with play surfacing--many of these are still in use today. The American Society for Testing and Material publishes standards for play equipment and safety surfacing.



Dorbrook Recreation Area (1996)



Holmdel Park (1999)

2000s – The Park System takes the lead in designing and building universally accessible playgrounds for children of all abilities.



Dorbrook Recreation Area-Challenger Place (2004)

The Serious Business of Playgrounds

Safety standards developed in the 1980s and 1990s, plus the Americans with Disability Act of 1990, shaped the design of modern playgrounds. This Park System added a Playground Safety Committee in 1996 to ensure compliance with all the new regulations. In 1999, NJ adopted the US Consumer Product Safety Commission Handbook for Public Playground Safety and required compliance with safety surfacing under play equipment by 2004 and for all other equipment by 2007.

As a result, the Park System trains staff to conduct regular playground inspections, and follows specific job descriptions for public playground designers, inspectors, installers and repairers. There are procedures for repairing and replacing equipment as well as standards for design, design elements, ADA accessibility, and parental amenities.



Park System inspectors are certified by the National Park and Recreation Agency to examine new playgrounds and major changes to existing ones. They look at installation standards, entrapment or strangulation hazards, fall zone requirements and many other items.

By the early 2000s, all Park System playgrounds had been upgraded to meet the State Playground Regulations adopted in 1999. In most cases, in order to be compliant, the existing playground was torn down and a new one constructed using modern materials and surfacing.

Current Challenges

Non-compliant play surfacing accounts for >75% of playground injuries. Choosing the right surface material has been a modern maintenance challenge. Eight Park System playgrounds have a poured in place (PIP) rubberized play surface (see Challenger Place, bottom left) and four have engineered wood fiber (EWF, see Turkey Swamp Park, above), a natural product made from virgin soft wood taken from the heart of trees.

In Park System testing, EWF outperformed PIP because the rubberized play surface loses elasticity and resiliency over time, especially during the freeze thaw cycle in the northeast. Plus, EWF is sustainable and can be used as mulch when it's time to replace, whereas PIP cannot be recycled. Therefore, the Park System continues to explore alternatives to PIP.

REFERENCES: Kaitlin O'Shea, "How We Came to Play: The History of Playgrounds," The National Trust for Historic Preservation, August 15, 2013. (This post is an abridged version of a paper written by Kaitlin O'Shea for HP201: History on the Land in the University of Vermont Historic Preservation Graduate Program. This paper was researched using issues of the periodical, The American City, from the 1900s-1920s.) <https://savingplaces.org/stories/how-we-came-to-play-the-history-of-playgrounds/#.YpmsAuhKiUn> • Frost, Joe L. A History of Children's Play and Play Environments. New York, NY: Routledge, 2009. <https://www.pgpedia.com/p/playground-movement>. • Frost, Joe. (2012) Evolution of American Playgrounds. Scholarpedia, 7 (12):30423. http://www.scholarpedia.org/article/Evolution_of_American_Playgrounds. • Play and Playground Encyclopedia. Playground Association of America. <https://www.pgpedia.com/p/playground-association-america>

Storing The Autumn Harvest

Tanya Dinova, Park Ranger/Horticulturist

As the leaves begin to turn color and drop, the keen gardener knows the first frost is coming to mark the end of the growing season. This can happen anytime from late October to early November in our area. Crops are harvested, the gardens are put to bed and the family gatherings begin. Then we move those crops indoors to store them properly for the long winter.

Fall Food Storage

One method is to follow the sound practice of our ancestors. This may recall images of a grandparent's root cellar with carefully picked apples stored above boxes of golden potatoes and tied strings of dried peppers and herbs hung to the wall. The dark cavernous room with its dirt floor and meager light is filled with jars of sweet strawberry jam, sour pickles, canned tomatoes, and relishes.



Classic Root Cellar Image

Whether you stock your root cellar with homegrown produce or the bounty from a local farmer's market, it's a time-tested storage method that pays off.

If you are interested in visiting a farmer's market to stock up on fresh, local fall produce, consult this complete and up-to-date list: www.state.nj.us/jerseyfresh/searches/urban.htm



Local Farmer's Market (Red Bank).

Back to Our Root Cellars

Root cellars date back to the ancient civilizations. Archaeologists have found evidence of root cellars in Australia from 40,000 years ago (Fryer, 2011). Storing produce in a root cellar is the oldest, fastest and easiest method of storing food because it uses natural moist, cold storage.

Root Cellar Foods & Storage Tips

The most effortless crops to store in a root cellar are crops such as carrots, turnips, potatoes, onions, shallots, garlic, pumpkins, and winter squash. They don't need special preservation methods to keep them fresh during the winter.

In general, keep beets, cabbage, carrots, cauliflowers, celery, peppers, and green tomatoes in relatively moist conditions – packed in barrels of moist sand or sawdust. (You can buy builder's grade sand and sawdust at home improvement stores.)

Root crops should NOT be washed before storing. Their skin offers natural protection against disease infection, and you do not want to cause any abrasion or distortions in this natural barrier.

Trim the stem attached to beets to 1 inch, but leave the leafy tops of carrots before storing.



Trim the beet stem (but leave the carrot tops).

- **Cabbage** keeps well when stored three heads deep in crates or baskets. You can also stack them root side up on a shelf. Wrap each head in newspaper for protection.
- **Winter squash and pumpkins** should be cured in the sun before they are packed away. Keep them on a top shelf or off the ground as much as your space allows.

- **Sun curing:** pick these items early and leave them outside on the ground in the sun all day. This will help develop a hard, dry crust on the skin that's protective. It also dries out the soil so it just shakes off.



Butternut squash curing in the sun.

- **Potatoes** for storage should be harvested when they are fully mature. That is visible when the green plant has turned dry and brown. Allow newly harvested potatoes to cure for a day before putting them away in the cellar.
 - Check on potatoes throughout the winter as some may start to develop "eyes" or whitish, root sprouts. If this happens, simply break them off.
- **Freshly picked peppers** should be stored in a dark, ventilated box covered with sawdust.
- **Dried, shelled beans** should be stored in airtight jars away from the light.

- **Leeks and celery** will last for 2 months when planted in a bucket of slightly moist sand.



Leeks (with roots) in a bucket of moist sand.

- **Green tomatoes** should be harvested before the first frost with stems attached. Wash and dry well. Discard any that have bruises, spots, blotches or dimples. Pack them in shallow cartons amongst shredded paper, dry leaves or straw. Keep in a cool place between 50-70° F degrees.

- **Ripening green tomatoes:** Pick and examine for imperfections. If clear, put them in a brown paper bag with one ripe apple. Place the bag in a room where the temperature is 60-75° F. Light is not needed to ripen tomatoes indoors.* The apple naturally gives off ethylene gas (a natural growth regulator) that stimulates the ripening of any adjacent fruit, hence the saying “one bad apple spoils the bunch.”

- **Garlic** is harvested in late summer. To preserve the bulbs, braid the garlic stalks together so that all sides of the bulb are evenly exposed to air. Hang the braids in a cool, dark spot with good air circulation to dry for several weeks. Once dry, the garlic is protected and you can store it anywhere.



Garlic heads with stems attached, shown for braiding

- If you don't have a root cellar just hang the bulbs in a mesh bag in a dark spot – like a cool pantry.

*Yes, I too remember seeing green tomatoes lined up along the windowsill in the kitchen, but that is not the best way to hasten ripening.

Try This Unusual Vegetable

The Jerusalem artichoke is a tasty, low calorie, high nutrition vegetable that simply stores itself. A tuber-producing relative of the sunflower, it is more similar to a potato than ginger in terms of planting. To start, just find some fist-sized tubers and plant them in any soil, even poor soil, in a two-foot hole. Because they grow taller than corn and super thick, some people like to arrange them in a circle, like a fairy ring. To harvest, simply dig them up as needed. If not, leave them to grow again, producing a crop for the next year.



Jerusalem artichoke plant and flower.



Jerusalem artichoke base with tubers (close up).



Jerusalem artichoke fist-sized tuber to plant.

Recommended Preserving Methods

FRUITS	
Apples: store fresh apples in root cellar; certain species can be cut into thin slices and dried, can applesauce	Grapes: can juice, wine
Apricots: can	Peach: can
Blueberries: freeze	Pear: can and store in root cellar
Cherries: can	Strawberry: freeze or preserves

VEGETABLES	
Asparagus: freeze	Onions: hang in braids or net bags
Beans, dry: dry on vine and store in airtight containers	Parsley: green in pot on windowsill, or dry
Beets: root cellar, in sand or sawdust	Peas: freeze
Broccoli: freeze	Potatoes: root cellar
Brussels sprouts: freeze, or leave in garden and keep eating	Pumpkin: store in dry, warmish spot of root cellar
Cabbage: sauerkraut, or wrapped in newspaper in root cellar	Rutabagas: root cellar in sand or sawdust
Carrots: root cellar in sand or sawdust	Tomatoes: can juice, puree and whole
Celery: root cellar	Turnips: root cellar in sand or sawdust

How to Build a Root Cellar

In general, to build a root cellar in your own home, you'll need a small room in the coldest corner of the cellar or basement. You could also combine the root cellar with an outdoor emergency shelter. Another option would be to adapt an unused outside stairwell (place a protective covering on the ground, stack some crates on top) or the bulkhead leading into the basement.

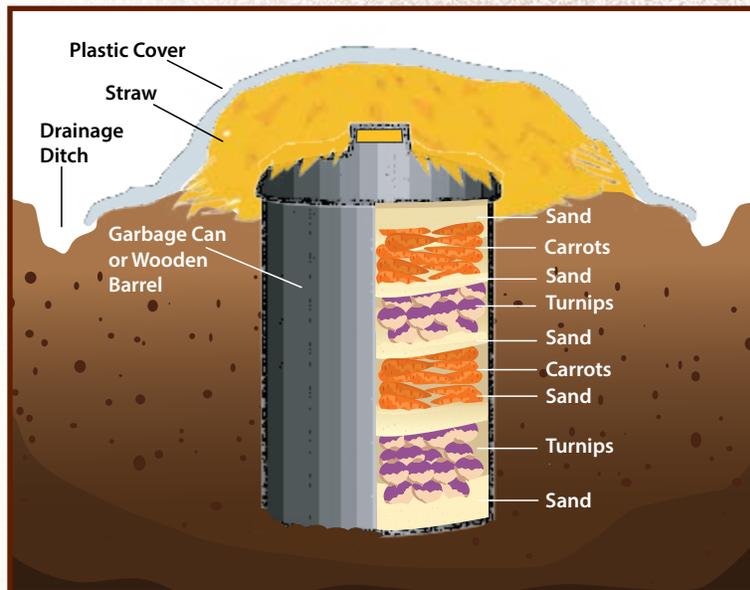
For specific plans, contact the Cooperative Extension of Monmouth County (specialists in community agriculture/farming) at <https://monmouth.njaes.rutgers.edu/> or visit the library in the Deep Cut Gardens Horticultural Center.



Root Cellar literature at Deep Cut Library

How to Create a "Mini" Root Cellar

Bury a trash can into the ground to create a mini-root cellar for winter storage (punch holes in the bottom first). Leave the rim a few inches above ground to keep the water out. Seal with a tight lid, and cover the top with 18" of straw for insulation.



At harvest time, select the vegetables to be stored. Start with a layer of clean, washed builder's sand or fresh cut sawdust on the bottom. Then, place a neat layer of root vegetables or fruit. Cover that layer with sand or sawdust, and continue layering until the bin is full. Handle the veggies gently to prevent bruising or damage.

Take a Fall Harvest Class With Us!

Deep Cut Gardens offers an array of lectures, workshops and interactive programs tailored to meet the needs of the home gardener.

H1114A **Composting Indoors for the Home Gardener** 9/25/21*

H1814A **Eco-Friendly Home and Garden** 9/26/21*

H0914A **Harvest Deco Mesh Wreath** 10/23/21

H1914A **Grow Your Own Mushrooms** 10/24/21

H2014A **Wicked Pumpkin Composting** 11/6/21

H1714A **Cornucopia Grapevine Wreath-Fruits of the Harvest** 11/7/21

*These may be over by the time you get this newsletter, but we wanted you to know what was available and may be offered again later in the year.

Benefits of a Root Cellar

With a renewed interest in gardening, food security, and sustainable living, root cellars are the new, yet old-world must-have. Besides being "cool," both literally and figuratively, they can save you money, time and material.

Peace of Mind

Stored items in a root cellar eliminate last-minute dashes to the grocery store if you are trying to make a different menu every night.

Save Money

The cost of materials to build a root cellar is less than you would spend in a single winter purchasing produce at retail cost.

Eat Better

Root cellars are another way to increase fresh produce into your diet, as they allow you to store and have access to plenty of seasonal, fresh, wholesome and nutritious produce.

Pride of Preparation

A well-stocked root cellar will give you that priceless feeling of security that comes with being prepared.

Nature Connection

A root cellar can foster a direct and deeply satisfying connection with the earth, especially during winter when gardeners feel trapped inside or deprived of "working with the land."

Make Memories

A root cellar can be a practical knowledge resource for your children, and offers a great hiding place during their next round of "hide and seek."



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Healthy Plants & Human Microbiomes

Kate B. Lepis, Ph.D., Horticulturist

Research shows a diet high in fruits and vegetables can help lower the risk of heart disease, stroke, diabetes, eye or digestive problems, and even lower the risk of some cancers.¹ The amount we need to eat in order to obtain these health benefits depends on age, sex, weight, and physical activity². USDA guidelines at <https://www.myplate.gov/> suggest, on average, adults should eat 1½ -2 cups of fruit and 3 cups of vegetables each day. Eating a variety of vegetable types and colors helps ensure you are getting an assortment of vitamins and minerals.



Healthy Foods Support a Healthy Microbiome

When we eat nutrient rich foods, we not only feed our bodies, but also the different microbes that live in us and on us—we call this beneficial community of microscopic creatures the human microbiome. Of the trillions of cells that make up the adult human body, only 1 out of 10 actually contain our DNA, the rest are microbial companions.³

In 2007, the National Institute of Health began mapping the microbial genes found in and on the bodies of healthy adults (eg, in our stomach, on our scalp, up our nose, etc.). Each of these areas is home to different microbes that help our bodies function. They digest food and synthesize vitamins that we cannot make on our own. They help regulate our immune system. And when working properly, they can prevent obesity, diabetes and gastrointestinal issues like Crohn's disease.³

Every human hosts a unique microbiome, similar to a fingerprint. Research shows we inherit microbes from our parents, and as we grow many of those stay with us. Lifestyle factors, especially diet, also play a significant role in the make-up of our microbiome. Diets high in fiber sourced from fruits, vegetables, legumes and nuts tend to support a diverse gut community.

Dietary fibers feed our microbes; as the microbes digest and ferment those fibers, the byproducts (short-chain fatty acids) nourish the cells lining the digestive tract, improve immune function, and help prevent inflammation, which can lead to colon cancer.⁴

Probiotics Can Help

Eating probiotics can help re-establish lost microbes. Beyond yogurt, try eating pickled or fermented foods.⁵ Choose pickles preserved in brine instead of vinegar for the best results.



Photo by Sheila Brown, Public DomainPicture.net

Eating foods from around the world can also help diversify your microbial community. Try miso (soybeans fermented with brown rice), commonly found in Japanese cuisine and often served in soup. Those with German heritage will be familiar with the taste of sauerkraut (pickled cabbage) often added to sandwiches or salads. Kimchi is a traditional Korean food composed of red cabbage fermented with garlic and chili peppers.



Miso soup - Japanese. Photo by Dr. Bernd Gross, Wikicommons.



Sauerkraut - German. Photo by jules:stonesoup, Flickr.



Kimchi, traditional Korean food. Photo by Charles Haynes & Nate Beaty, Wikicommons.

Plants Also Have Microbiomes

Healthy plants support their own beneficial microbiomes. Plants release a mixture of fat, protein and carbohydrate, called exudates, over every surface. These exudates feed beneficial microbes, allowing them to flourish on the surface of leaves, stems and roots. By colonizing the plant surface, the beneficial microbes prevent disease causing agents from taking hold.⁶



Aerial view of the All-America Garden at Deep Cut.



All America Garden harvest – beets, cucumbers and yellow summer squash.

You can promote this plant/microbe relationship by managing the gardens using organic methods. Maintain soil fertility by planting cover crops and using compost. This may also help to inoculate the plant environment with beneficial microbes that can then take advantage of the plant's exudates.

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Parasitic Plants

Blake Beyer, Park Naturalist

The mere mention of the term ‘parasite’ can evoke a shoulder-raising shudder of disgust. This category includes a nightmare cast of universally-disliked critters such as ticks, tapeworms, leaches and lice. New Jersey is also home to several species of plants that derive a portion or all of their nutrients from a host, a survival tactic that can best be described as parasitic.

Pipe Plants Tap Into Fungal Networks

The most common plant relying on another to survive is the Indian Pipe (*Monotropa Uniflora*). Found in well-established forests, this curious looking plant has a 3-10” stalk topped by a single downward-facing, bell-shaped flower. It is sometimes called the “Ghost Plant” because it is completely devoid of chlorophyll, giving its leaf-like scales and flower a ghostly, translucent appearance. This pale complexion also causes many people to mistake it for a fungus, which it is not.



Indian Pipe (living), and close-up.



Indian Pipe (dying & dead): Once pollinated by insects, the flower will blacken and rotate 180° to face skyward, maximizing the dispersal of its minute seeds by wind.

The lack of chlorophyll means the Indian Pipe is incapable of photosynthesizing to create its own energy. So it must find another source. In a bizarre reversal of the typical trophic order, the Indian Pipe gets its nutrients from fungi. Using stubby roots, it links with fungal filaments underground (aka the mycorrhizal network) to siphon off the nutrients it needs. This mycorrhizal connection is common between plants and fungi, typically acting as a mutualistic relationship: plants share sugars and carbohydrates produced through photosynthesis with



fungi, while the fungi help supply the plants with minerals and water. But the Indian Pipe sours this relationship by stealing the fungi’s nutrients and providing nothing in return.

Pinesap plant is a close relative of the Indian pipe and uses the same method of stealing nutrients from fungi. Indian pipes have only a single flower while pine sap has up to a dozen. Photo: Wiki commons.

This one-sided relationship of Indian Pipe is mirrored by another plant often found sharing the same forest floor habitat.

Beechdrops Steal Nutrients From Trees

Beechdrops (*Epifagus virginiana*) grow leafless flower stalks throughout the summer. Small white and reddish-purple striped flowers dot the plant’s stalks from August through November awaiting pollination by winter ants.



Beech Drop flowers in full bloom, distance and close up. Photo: Katya Shultz, Wikicommons



As an annual, Beechdrops must complete their entire life cycle within one year, beginning from

seed each spring and dying off in the winter. They are incapable of completing this life cycle without the presence of beech trees.

Similar to Indian Pipe, Beechdrops lack chlorophyll. But they steal their nutrients they need directly from the beech tree itself, as opposed to the fungi supported by the tree. As the Beechdrop seed germinates, it connects with its host tree through a specialized, root-like structure called haustoria. The haustoria extract minerals, nutrients and water from a host by burrowing into the host plants’ tissue, like traditional roots burrow into soil.

Dodders Strangle Their Host for Sustenance

Leaving the forest floor behind for fields and pond edges, we needn't look too hard to find our next freeloader. Dodder (*Cuscuta spp*) is no small or elusive plant; its bright orange vines engulf a host in a blanket of what looks like silly string. Despite the whimsical appearance, Dodder is a ruthless parasite.

Starting anew each season from seed, the young Dodder sprout begins a quest; its leafless vine slowly spirals counter-clockwise in search of a host. During this phase, the Dodder is both feeling and smelling for a host. It is able to detect volatile compounds (released by vapor) produced by plants. This helps the Dodder determine which species is around and twist itself to grow towards the more preferred host. Once a connection is made, the Dodder spirals up the stem of its host inserting its specialized haustoria along the way. The haustoria helps provide the Dodder with nutrients and anchors it to the host.



Dodder engulfing a Button Bush and with tightly coiled vines around its host. Photo:Wikicommons

As the Dodder grows larger and spreads across its host, its demand for nutrients becomes greater and greater and in some cases, can even kill the host plant. If successful, the Dodder will produce hundreds of small white flowers at the tips of its many vines, which later ripen into small, seed-filled fruits. The seeds are distributed by animals or by wind where they can lay dormant for up to 20 years until conditions are favorable to begin growing.

Surprise! “Friendly” Mistletoe is a Parasite

Known to most as a dried bundle of leaves and twigs hung in the doorway around Christmas, Mistletoe is associated with kisses and holiday cheer. But naturalists see it for what it really is—a hemiparasite. The Mistletoe begins its life cycle in January or February as a white, gelatinous coated seed at the end of a



Mistletoe Berries Photo:Agniesz Kakwiecien,Wikicommons

mature, shrub-like Mistletoe branch. These prominently displayed berries are quickly picked off by hungry birds that either reject the berry and wipe the sticky mess off of their beak and onto a branch, or eat it and pass it through their digestive system.

By either method, a seed is deposited onto a branch of a suitable host tree which can include maples, oaks, hickory and most other hardwoods for American Mistletoe (*Phoradendron Leucarpum*) or conifers like pines, cedars and larches for eastern dwarf Mistletoe (*Arceuthobium Pusillum*).

The first thing to sprout from the seeds are the haustoria which burrow under the bark and tap into the xylem of the tree. The xylem of a tree contains no sugars or nutrients but rather just water being transported from the roots to the outermost portions of the tree to be used for photosynthesis. This is where the hemiparasitic distinction comes in. Acting much like a grafted branch, the Mistletoe uses the host tree's water supply to carry out its own photosynthesis and create its own food. The young sprout will take over a year before it will grow even a single branch, at which point the connection to its host tree is well established and capable of supporting a larger plant.



During fall, Mistletoe is easily spotted amongst their bare host tree. Photo: Wikicommons



Leafless branches of Dwarf Mistletoe Photo: USDA Forest Service, Bigwood.org

The host tree of American Mistletoe is not burdened too heavily by its presence, but can make the tree more susceptible to disease. Trees infected with Dwarf Mistletoe however, develop abnormally dense branching structures called “witches brooms”, become more susceptible to other diseases and generally degrade in health as the plant spreads through the canopy of the tree.

The relationship between parasites and their hosts are fascinating yet often gruesome one-sided interactions. These evolutionarily choreographed attacks by a parasite are all the more intriguing when mounted by something as innocuous as a plant. This will, perhaps, provide a new lens to view the plant kingdom as not “just a plant” but something capable of dynamic interactions and to some degree, decision making.

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FALL LEAF FROLIC



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