McGill Health and Wellness Series: Office Plants for your Health
What We’ll be Covering

• Houseplant benefits.
• Houseplants for the office.
• Houseplant care:
  – How to water
  – Differences in soil
  – Pots, and how to use them.
  – Fertilizer…?
• Common unhappy houseplant symptoms.
Houseplant Benefits

• Several studies using different experimental designs have linked the presence of houseplants to a range of positive psychological and physiological benefits.

(Larsen et al. 1998; Shibata and Suzuki 2002; Han 2008)
Psychological Benefits

- Fjeld et al. 1996:
  - Fatigue symptoms 30% lower in offices with plants.

- Rappe and Linden 2004:
  - Plants in nursing homes greatly benefitted the mood of patients.

- Larsen et al. 2005:
  - Participants reported increased levels of comfort with plants.

- Bringslimark et al. 2007:
  - Self-reported greater productivity and lower stress.

(Kaplan and Kaplan 1989; Ulrich et al. 1991; Kaplan 1995; Larsen et al. 1998; Shibata and Suzuki 2002; Han 2008)
Psychological Benefits

• Lohr et al. (1996) Journal of Environmental Horticulture:
  – 96 students
  – Looked at images with and without plants in the room.
  – Image recognition test
  – With plants:
    • Better test results
    • 12% faster
    • Felt more attentive
    • Smaller rise in blood pressure while performing task (less stress)
Physiological Benefits

• Include:
  – Faster post-operative recovery time (by 1-3 days).
  – Fewer post-operative complications.
  – Lower heart rates.
  – Lower blood pressure.
  – Greater tolerance to short-term discomfort.
  – Fewer sick days from work.

(Fjeld et al. 1998; Lohr and Pearson-Mims 2000)
Physiological Benefits

• Fjeld et al. (1998) in Indoor and Built Environment:
  – 51 subjects randomly exposed to extended periods with and without plants.
  – Study assessed neuropsychological, mucus membrane, skin symptoms.
  – Plants = 37% reduction in cough, 30% reduction in fatigue, 23% reduction in dry/hoarse throat and skin dryness.

(Fjeld et al. 1998)
Physiological Benefits

• Park and Mattson 2008:
  – Compared 90 appendectomy patients before and after surgery.
  – 45 in plant rooms, 45 in rooms without.
  – Plant room patients:
    • Needed fewer pain medications after day 3
    • Lower heart rate before and after surgery
    • Lower systolic blood pressure before and after surgery.
    • Lower rates of anxiety, fatigue (self-reported)

(Fjeld et al. 1998)
Houseplant Benefits

• Why would houseplants positively effect health and stress levels?

• Psychological benefits hypothesis:
  – We evolved around green spaces, they still relax us!
  – Low stress = better health!
  – But may be a placebo effect.

• Also… air quality improvements!

(Fjeld et al. 1998)
Air Quality

• The great indoors is a harsh place:
  – Low humidity
  – High ambient CO$_2$
  – High microbe count in air.
  – Volatile Organic Compounds (VOCs)
    • Toxic compounds released by many common household items.
      – Paints
      – Cleaners
      – Printer ink

(Brown et al. 1994; Orwell et al. 2006; Solomon et al. 2008; Burchett 2009)
Air Quality

• Increase ambient humidity.
  – Release water vapor from leaves.
  – Indirect effect of watering.
• Decrease CO$_2$:
  – Stomata in leaves takes CO$_2$ out of air, releases O$_2$.
  – Microbes in soil also sequester CO$_2$.
• Best benefits removal of VOCs and particulate matter.

(Brown et al. 1994; Orwell et al. 2006; Solomon et al. 2008; Burchett 2009)
Air Quality

• Can remove 100% of some volatile organic compounds
  – Effectiveness varies by species
  – Function of both plant and soil.
  – Soil microbes take up some VOCs, break them down or sequester them.
  – Plants can take some up directly through stomata and through roots.

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Air Quality

• Formaldehyde example
  – Wolverton et al. 1984
  – Common VOC
  – As little as ~50 ppb can cause adverse health.
  – *Chlorophytum elatum var. vittatum* (spider plant)
    • 37 ppm to <2 ppm in 24 hours.

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Air Quality

• Have also been used to remove unpleasant odor molecules indoors.

• Oyabu et al. (2003):
  – Plants in nursing homes
  – Removed hydrogen sulfide, ammonia and methyl mercaptan through leaves.

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Air Quality

• Particulate matter:
  – Wolverton and Wolverton 1996.
  – Compared plant filled and empty rooms in real homes.
  – Microbes examined included fungi and bacteria.
  – Airborne microbial levels 50% higher in plant-free rooms after just 48 hours.

• Modes of action:
  – Antimicrobial compounds released by plants
  – Soil uptake.

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Houseplants for the Office
Office Plants

• Office environment is hostile to many plants.
  – Poor light
  – Dry air
  – Temperature extremes
• However some plants can thrive in these conditions.
Office Plants

• Plants we recommend:
  – Jade plant
  – English Ivy
  – Mother-in-law’s tongue
  – ZZ plant
  – Begonia
  – Inch plant
  – Spider plant
  – Golden pothos
  – Christmas cactus

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Office Plants

• Make your space more plant friendly!

• Artificial office light is very poor for plants.
  – Missing a wavelength crucial to plant growth.

• Can buy a cheap plant light which provides all the light a plant needs, even indoors!
  – Comes as a halogen light or normal light bulb.

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Caring for your Plants.
How to Water

• #1 way people inadvertently kill their houseplants.
• There is a proper technique!
• Too much water kills faster than too little.
  – “Killed with kindness”
• Most houseplants like to dry out between watering.
Rules of Watering

• Always have a watering tray.
  – Never have your plant in a pot without a drainage hole.

• Water with lukewarm water.

• Water when the soil is completely dry (for most species).
  – A soil moisture meter can tell you for sure!

• Water until a little bit of water drains from the bottom of the pot.
  – If a LOT drains, pour out the water.
What is Soil?

- Soil is your houseplant’s entire world!
- VERY important.
- Can be made of many different things:
  - Peat
  - Sand
  - Little rocks (vermiculite and perlite)
  - Styrofoam
Types of Soil

• Different plants need different soils.
  – Soils differ by how well they retain water.
    • Peat holds water well, sand drains quickly, etc.
  – … and how well they retain fertilizer.
    • Vermiculite, perlite and Styrofoam do this.

• Most houseplants are tropical.
  – Like ‘water retaining soil’.
  – Most ‘houseplant soils’ are water retaining, with lots of peat.
Types of Soil

• Specific soil mixes now available in many stores:
  – Use appropriate soil where possible.
  – “Cactus soil” for cacti species, ect.

• Never buy dollar store or no-name brand:
  – Sub-par soil.
  – Your plants will suffer and may die.

• Best brands:
  – Miracle-Gro
  – Fafard (Quebec Company)
Pots
Types of Pots

• Many different styles and varieties to choose from.

• Decorative vs. the actual pot.
  – Many new decorative styles.
  – Difference:
    • Decorative have NO drainage holes.
  – NEVER have your plant in a decorative pot alone.
    • No drainage = dead plant.

• Plant in a cheap plastic pot, then put plastic pot inside decorative pot!
Repotting

• ALL plants will eventually need repotting.
  – Frequency depends on the species.
  – If roots are coming out the bottom of the pot, it’s time.
• Choose a pot at least 2 cm diameter larger than the previous one.
  – Will increase the time to the next repotting.
How to Pack a Pot

• Bottom of pot:
  – Can put rocks or Styrofoam to increase drainage.
    • Necessary is you plant in a decorative pot!
  – If you don’t want soil falling out of drainage holes, cover with a coffee filter!

• Planting the plant:
  – Leave ~1cm of the pot above the soil line.
    • Will make watering easier.
  – Try to cover the old soil with a layer of new soil.
Fertilizer
Fertilizer

• All houseplants benefit from fertilizer.
  – Some need it to survive!
• The more often you repot, the less you may need fertilizer.
  – Many soil mixes now contain some level of fertilizer,
• MANY different brands and concentrations.
• Three numbers on the front:
  – N-P-K
  – N: Nitrogen → Leaves
  – P: Phosphorus → Flowers and fruit
  – K: Potassium → Roots and immune system
Fertilizer

• Higher number of one relative to the other two:
  – Trying to emphasize that type of growth.
• Balanced fertilizer has equal numbers:
  – Ex: 20-20-20
• Most fertilizer brands tell you what they’re good for!
• Too much fertilizer WILL cause problems.
  – Follow the label!
Common Problems

Tree to People:
I'm Dead.
Get new tree & plant it here, OK?
Thanks
Leaf Problems

• Leaves with curling dry ends (common in ferns)
  – Humidity is too low!
  – Mist plants periodically.

• Sticky or shiny leaves:
  – You have a bug infestation, check for other symptoms to figure out which one!

• Leaves with brown edges.
  – Watering problem. You are watering too much or too little.
Leaf Problems

• Little black dots on leaves:
  – Those are likely insect faeces.
  – Check for thrips or caterpillars.

• Yelllowing of leaves between veins.
  – Your plant is suffering from a nutrient deficiency.
  – Fertilize it right away!

• Leaves getting large spots which are light brown and crispy:
  – Have you moved your plant recently? It’s now getting too much sun and the leaves are burning.
Overall Problems

• Plant getting long and straggly (lots of stem between leaves).
  – Plant is not getting enough sun and is trying to grow towards the sun.

• Entire plant is wilting:
  – Likely it has been overwatered very severely or underwatered very severely.
    • Will recover from under watering, not over watering.

• Lots of leaves are starting to die (oldest first), but the plant was doing well before.
  – You probably need to repot.
  – When stressed, plant will kill its least efficient (oldest) leaves first.
Overall Problems

- Plant declining slowly, with no obvious cause.
  - Is it in the appropriate soil?
  - When did you last fertilize it?
  - Did you move the plant to a darker spot in the room?
  - When did you last repot it?

- Go through this list, and you should be able to figure it out.
Conclusions
Conclusions

• Even a few plants can have a profound impact on your mental and physical wellbeing!

• Try new plants! Don’t feel discouraged if some die.
  – The people with the most houseplants have also killed the most houseplants!

(Tarran et al. 2002; Orwell et al. 2006; Liu et al. 2007; Burchett 2009)
Thank You.
Questions?
Pests...
The Big Bad Five

- Five most common insect pests:
  - Mealybugs
  - Scales
  - Spider Mites
  - Thrips
  - Fungus Gnats

- Important to know how they reproduce, and how they spread.
- Also, always isolate an infected plant!
Mealybugs

- Looks like a white fungus.
- Lays eggs in the plant itself, or can give birth to live young.
- Moves from plant to plant by crawling.
- Control:
  - Safer’s Soap
  - 50:50 ratio of isopropyl alcohol and water, with 1% detergent.
  - If houseplant is cold tolerant, place outside!
- Mealybugs are tropical, they can’t stand the cold.
Scales

• Looks like a brown spot on your plant.
• Also moves between plants by crawling.
• Similar lifecycle and control as the mealybug.
  – On broad-leaved plants, you can also wipe them off with a cloth.
Spider Mites

- Little red bugs that make webbing on your houseplant.
  - Gets its name from the webbing it makes.
  - Less than 1mm long, you’ll see the webbing but not the bug.
- Doesn’t mind the cold, can’t kill by putting the plant outside.
- Crawls between plants.
- Reproduces VERY quickly.
  - 5 day lifecycle, and each female lays 100s of eggs.
- Spray with an insecticidal soap, and spray LOTS!
Thrips

• Tiny, VERY problematic bug.
• Will likely see damage and poop, before you see the insect.
• Adults can fly.
  – An infestation can quickly get out of hand!
Thrips

• Immediately quarantine infected plants!
  – Putting them outside is best.
• Let the soil dry out as much as possible without harming the plant.
  – Larvae need wet soil to thrive.
• Spray every inch of the plant with Safer’s Soap (bottom AND top of leaves).
• Pray.
Fungus Gnats

- The traditional office “little fly”.
- Little black flies.
- Larvae live in soil.
- Two ways to control:
  - Let your soil dry out completely before watering.
  - Use yellow fly tabs.
    - The gnats are attracted to yellow.
- For a VERY bad infestation, use “pantyhose” method.
  - Cover the top and bottom of your pot with pantyhose.
  - Air can get through, but gnats can’t! So nowhere to reproduce!
Literature Cited

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