

### Which Mulch?

- Two general types
  - Inorganic
  - Organic

An illustration of a person wearing a green visor and gloves, kneeling and planting a small tree in a hole. The person is using a shovel to work the soil around the base of the tree.

### Inorganic mulches

- Rock
- Recycled rubber
- Plastic film
- Landscape fabric

A photograph of a playground area with a colorful slide and a basketball hoop. The ground is covered with a light-colored material, likely a type of inorganic mulch like recycled rubber or plastic film, used for safety and maintenance.

## Inorganic mulches

- Advantages
  - Don't decompose over time
  - Similar moisture savings as organic mulches
  - Appearance
  - Potential cost savings (don't need to reapply as often)
  - pH neutral
  - Recycled product

## Inorganic mulches

- Disadvantages
  - Don't contribute organic matter or nutrients
  - Appearance – some look 'fake'
  - Higher initial cost
  - Rocks used as mulch may wedge in bark or damage tree trunks
  - Potential increased heat/light reflectance

## Organic mulches

- Pine bark
- Hardwood bark
- Recycled pallets
- Cedar or cypress bark
- Wood chips
- Ground trees "*Storm de jour*"
- Pine straw
- Composted materials

## Organic mulches

- Advantages
  - Add nutrients and organic matter
  - 'Natural' appearance
  - Weed suppression

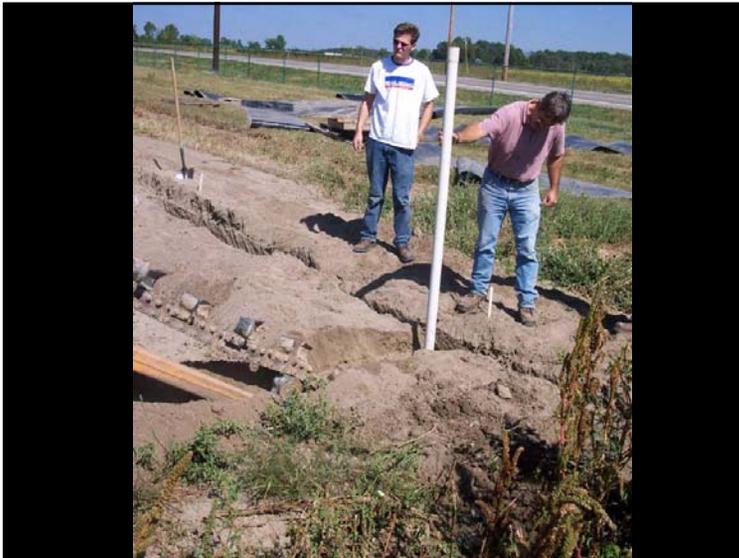


## Organic mulches

- Disadvantages
  - Need to be reapplied periodically
  - Nutrient 'tie-up'
  - Color washes out over time
  - Potential allelopathic effects on landscape plants

## Objective

- Compare effects of common organic mulches on:
  - Growth
  - Photosynthetic gas exchange
  - Plant nutrition
  - Soil moisture
  - Soil pH



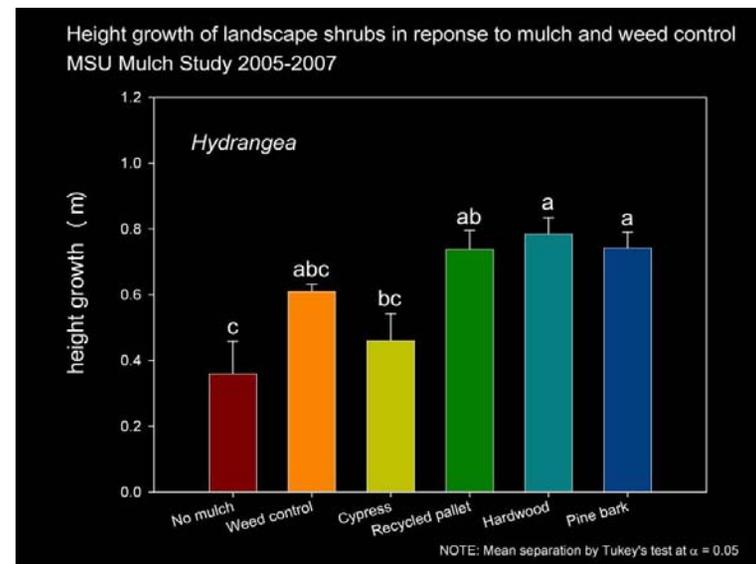
## MSU Mulch trial

- 6 treatments
  - No mulch
  - No mulch + weed control
  - Pine bark
  - Hardwood fines
  - Cypress mulch
  - Recycled pallets
- 12' x 12' plots
- Each treatment replicated 4 times
- All mulch applied to 3" depth



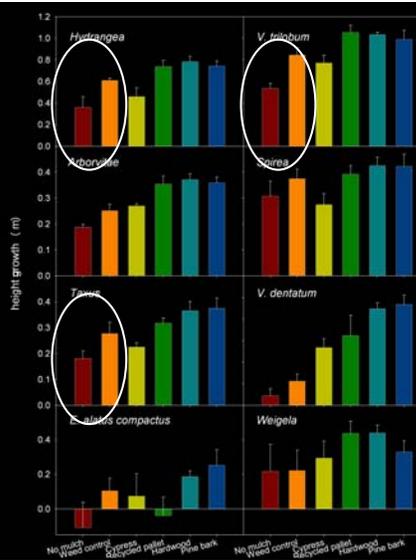
## Measurements

- Volumetric soil moisture
  - 2005-2006
- Soil pH
- Weed assessment
  - Fall 2006
- Photosynthetic gas exchange
  - (*Viburnums* & *Hydrangea*)
- Growth
  - 2005-2007



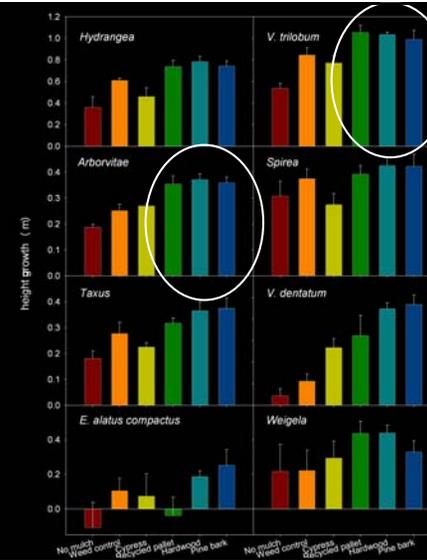
## Height growth response

- Weed control increased growth relative to No mulch plots



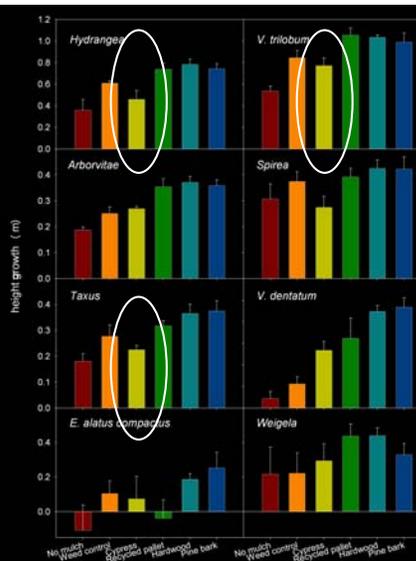
## Height growth response

- Weed control increased growth relative to No mulch plots
- Mulches increased height growth compared to un-mulched plots



## Height growth response

- Weed control increased growth relative to No mulch plots
- Mulches increased height growth compared to un-mulched plots
- Plants under cypress mulch grew less than with other mulches



## Weed assessment



## Weed populations varied by treatment

|           | Counts per plot |                  |                 |
|-----------|-----------------|------------------|-----------------|
|           | Annual grasses  | Common dandelion | Yellow nutsedge |
| Cypress   | 16a             | 39a              | 61ab            |
| Pine bark | 9a              | 9a               | 21bc            |
| Pallet    | 23a             | 30a              | 75a             |
| Hardwood  | 78a             | 66a              | 100a            |
| Weed free | 0a              | 0a               | 0c              |
| No mulch  | 213b            | 226b             | 10c             |

NOTE: Means within a column followed by the same letter are not different at  $\alpha = 0.05$

## Photosynthetic gas exchange



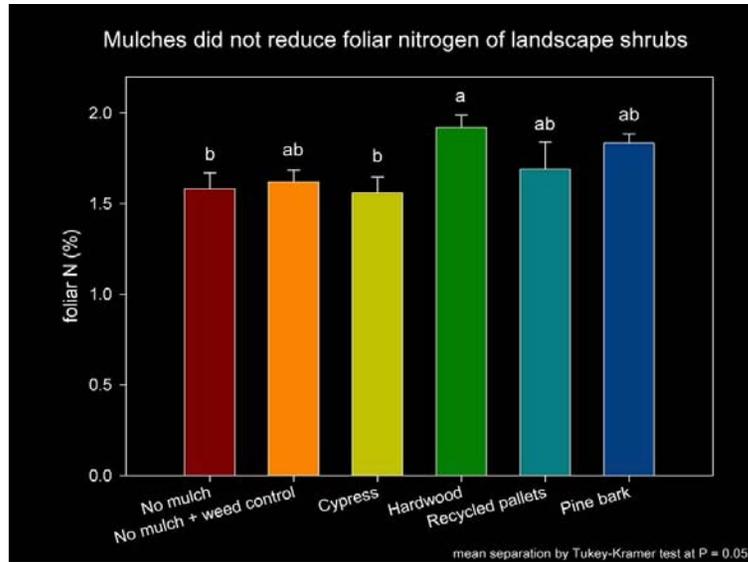
## Net photosynthesis of landscape shrubs in response to mulch and weed control



NOTE: Mean separation by Tukey-Kramer test at  $\alpha = 0.05$

## Foliar Nitrogen





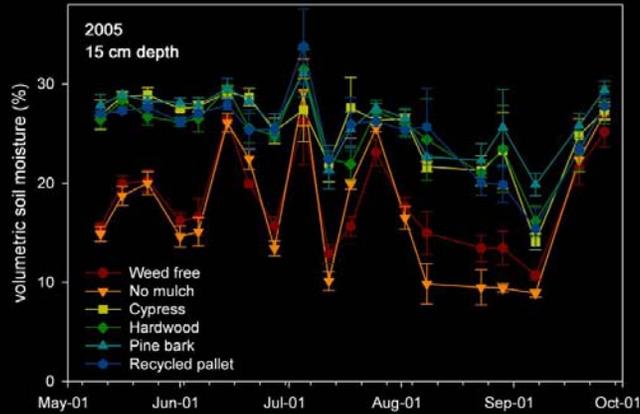
Mulch did not affect soil pH after 3 years  
MSU Mulch Study 2005-2007

| Mulch            | pH    |
|------------------|-------|
| Cypress          | 6.91a |
| Recycled pallets | 6.91a |
| Pine bark        | 6.96a |
| Hardwood         | 6.96a |
| No mulch         | 7.00a |
| Weed free        | 7.01a |

NOTE: Mean separation by Tukey's test at  $\alpha = 0.05$



Volumetric soil moisture in response to mulch and weed control  
MSU Mulch study: 2005



NOTE: Error bars indicate standard error of mean

## Summary

- Growth response varied by species but was generally similar for Pine bark, Hardwood, and Recycled pallets
- Mulch increased soil moisture
- Mulch did not affect soil pH
- No evidence of nutrient 'tie-up'

## Why mulch?

- Soil moisture conservation



## Why mulch?

- Weed control



## Why mulch?

- Add organic matter



## Why mulch?

- Aesthetics



## Why mulch?

- Plant protection



## Is mulch a fire hazard?

- Several reports have documented building fires associated with mulch
- OSU study found that rubber mulch was the most flammable; cocoa mulch, coarse pine nuggets, hardwood bark were least flammable



## Is cocoa mulch dangerous for dogs?



## Is cocoa mulch dangerous for dogs?

- Cocoa mulch contains theobromine
- ASPCA Poison Control Center has documented cases of clinical symptoms (tremors, vomiting, tachycardia) in dogs after consuming mulch
- ASPCA recommends avoiding the use of cocoa mulch around dogs with “indiscriminate eating habits”



## What about hot mulch?



## What about hot mulch?

- ‘Hot’ or ‘Sour’ mulch is produced under anaerobic conditions. Breakdown products are highly acidic (pH 2-4)
- To reduce problems, spread mulch and allow to cool before applying to sensitive plants
- Water thoroughly after applying

