

# Growing from Seed



## What is a seed?

- matured ovule

## What is a fruit?

- matured ovary



## What is the purpose of seeds?

- variability of offspring
- dispersal of offspring away from parent
- survival of plant through difficult conditions

## How is growing from seed different?

- variability of seed-propagated plants



*Cotoneaster microphyllus*

### Advantages?

- easy
- little equipment
- lots of plants!

### Disadvantages?

- variability!
- viability
- germination?

## The purpose of flowering is to produce seeds



*Arbutus unedo* 'Compacta'



*Araucaria araucana*

## Seed production is the goal!



Annual



Perennial

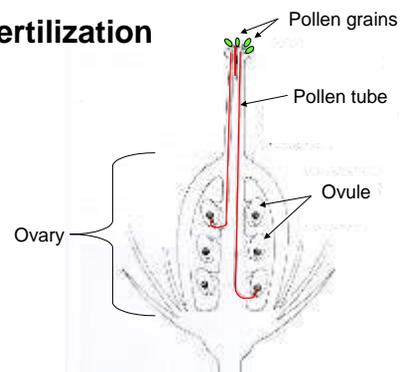


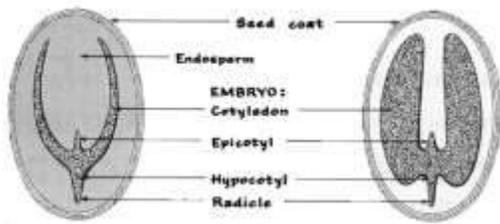
Shrub



Tree

## Fertilization





Embryo: develops from union of egg and sperm  
 Radicle: embryonic root  
 Epicotyl/hypocotyl: embryonic shoot

Endosperm: oil and carbohydrate storage

Seed Coat: mostly dead, hard tissue  
 > Protection from being crushed

## Seed Dormancy

Prevents germination under poor conditions



*Rosa rugosa*

Caused by:

- (1) hard seed coat
- (2) immature embryo
- (3) chemical inhibitors in seed and fruit

Dormancy is rare in domesticated species



Wild-collected seed may require pre-treatment



## Overcoming Dormancy

> Annual plants: temperature most important

In other plants...

Time (2):

- > embryo maturity
- > warm/cold/moisture

Stratification (1,3)

- > cold/moisture

Scarification (1)

- > breaking seed coat



*Ilex* sp.

## Stratification

Usually 60-90 days

35-40°F, moist

Protect from critters!



## Scarification

Artificially breaking down the seed coat



Mechanical scarification

### Mechanical

### Hot water

- > Put in ~200°F H<sub>2</sub>O
- > Allow to soak overnight
- > Sow soon, keep moist

## Germination

Conditions for germination:



### Light

- > light requirement
- > no light requirement

### Moisture

- > increase in seed size

### Temperature

- > varies widely

### Oxygen

- > frozen, compacted, or waterlogged soil

## Germination

Occurs as the result of:

- > swelling of the endosperm
- > rupture of seed coat by emerging root
- > emergence of the shoot



## Germination aids

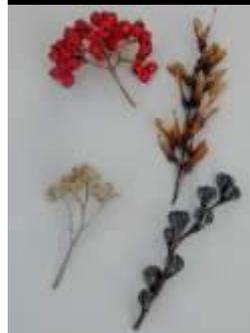


### Hormonal

- > Gibberellic acid: GA3

"Instant smoke"

## Collecting Garden Seeds



"hybrid" seed no good

### Time of ripeness

- > usually autumn

### Pick before the critters

- > fleshy fruits
- > "nut-like" seeds
- > dry capsules
- > conifers

Clean and dry seed as soon as possible

## Cleaning seeds

Fruit may inhibit the germination process



Quince

### Sugar content of fruit

> Inhibits H<sub>2</sub>O uptake

### Chemical inhibition

## Viability and storage

Seeds with thin coats lose viability quickly

Nut-like seeds lose viability quickly, too

> Horsechestnut, chestnut, oak, walnut

### Temperature:

> Best is 30-40°F

### Humidity:

> should be low

> store in sealed containers for long term



California Horsechestnut (*Aesculus californica*): seed set directly in media

## Seed Viability Test



## Priming seed

"convinces" seed that moisture conditions o.k.

4 hours is usually sufficient to imbibe seed



Discard water

Not beans/corn!

## Seed media selection

> Minimum 3" deep pot

> Seeding density



### Annuals:

Commercial mix

### Wild seed:

2 parts peat/coir

1 part perlite (grit)

> Longer germination

## Seed media selection

Mosses and liverworts love moisture/acidity



Growing under plastic or in shade is worse

Short germination time  
> pretreatment



Seed covering  
> pumice or other grit

Place pots in bright window



## Light systems

- > Avoid incandescent
- > 'Cool white' fluorescent



## Transplanting

Annuals/perennials when large enough to handle  
> minimizes growth reduction

Trees/shrubs/bulbs: less important

> sow thinly, liquid feed, transplant after 2-3 yrs?

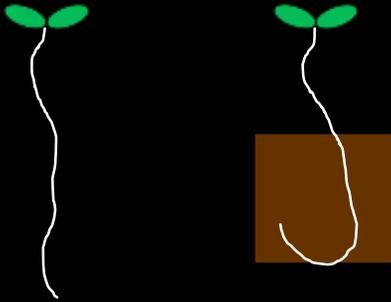


- > handle by leaves
- > lift from under root
- > avoid "J" root
- > root pruning

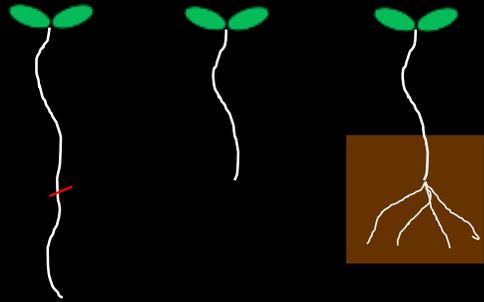
> Hang lights low

> Remove covers after germination

Do not "J" root transplants...



Prune excessively long roots...



## Resources

OSU Extension Service Publications  
<http://extension.oregonstate.edu/catalog/>

PNW 170 *Propagating plants from seed*

FS 220 *Collecting and storing seeds from your garden*

Most complete reference for seed



## Resources

*Practical woody plant propagation for nursery growers*  
B. MacDonald, Timber Press, 2006.

*Garden Flowers from seed*  
C. Lloyd and G. Rice, Timber Press, 1994.

*American Hort Society Plant propagation*  
A. Toogood, D.K. Press, 1999.

*The reference manual of woody plant propagation*  
M. Dirr and C. Heuser, Timber Press, 2006.