Production of Floricultural Crops

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Please prepare your scantron forms now. You need them….

Production Floriculture

- Greenhouse production
  - Bedding plants

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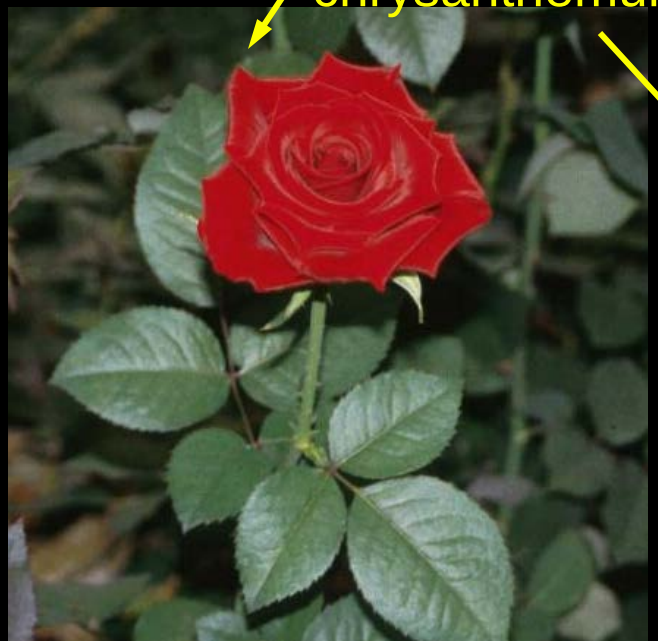

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  - Bedding plants
  - Potted flowering plants
    - » E.g. pot mums, poinsettia, Easter lily, etc
  - Cut-flowers
    - » Rose, alstroemeria, chrysanthemum
- Field flower production

Production Floriculture

Generally production floriculture is a very engineered process; (it is not like gardening)

- Propagation/planting
- Targeting the sale/harvest date
- Environmental control
- Controlling flowering

Production Floriculture

- Today we'll look at a few crops and we'll talk about what is normally done to produce the crop
- Easter Lily
- Potted chrysanthemum
- Cut-flower and potted roses

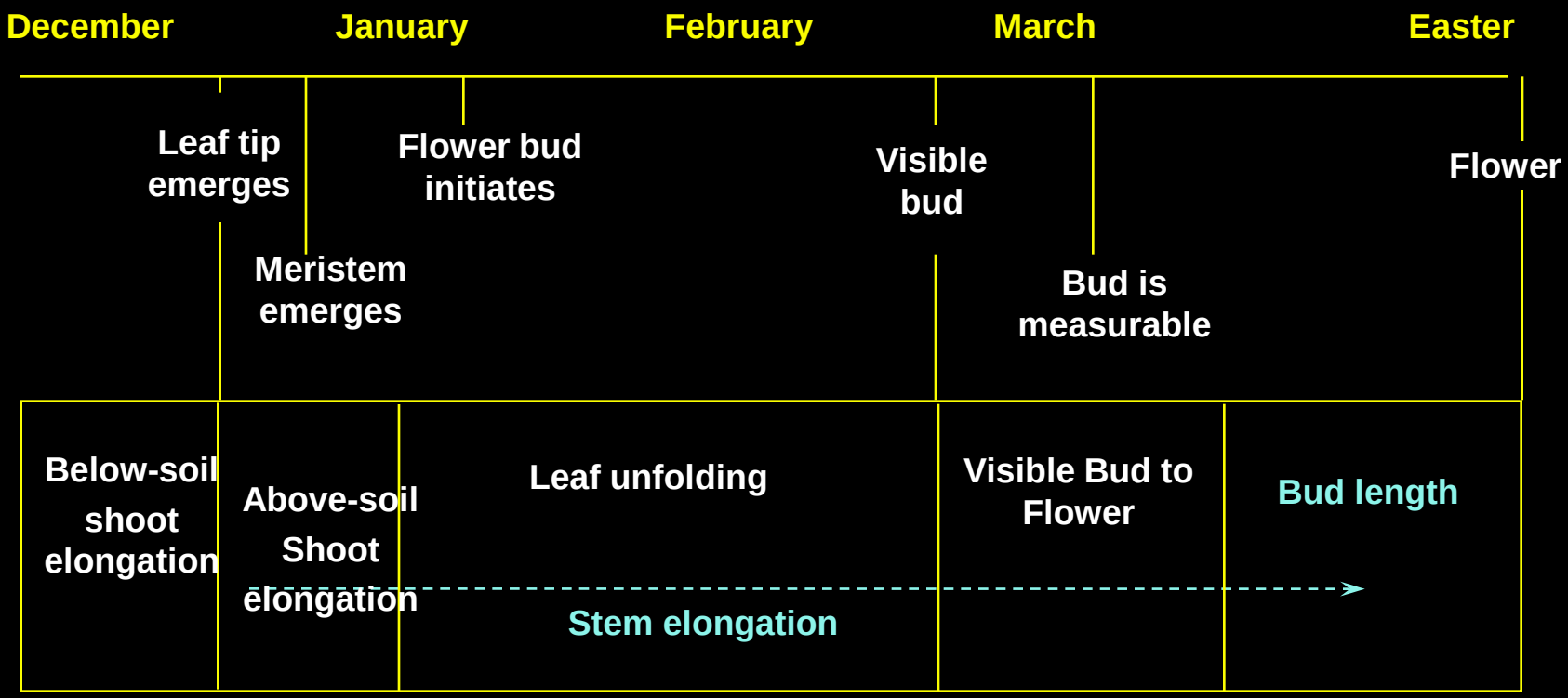
Easter Lily production

- Starts as field bulb production (3 years)

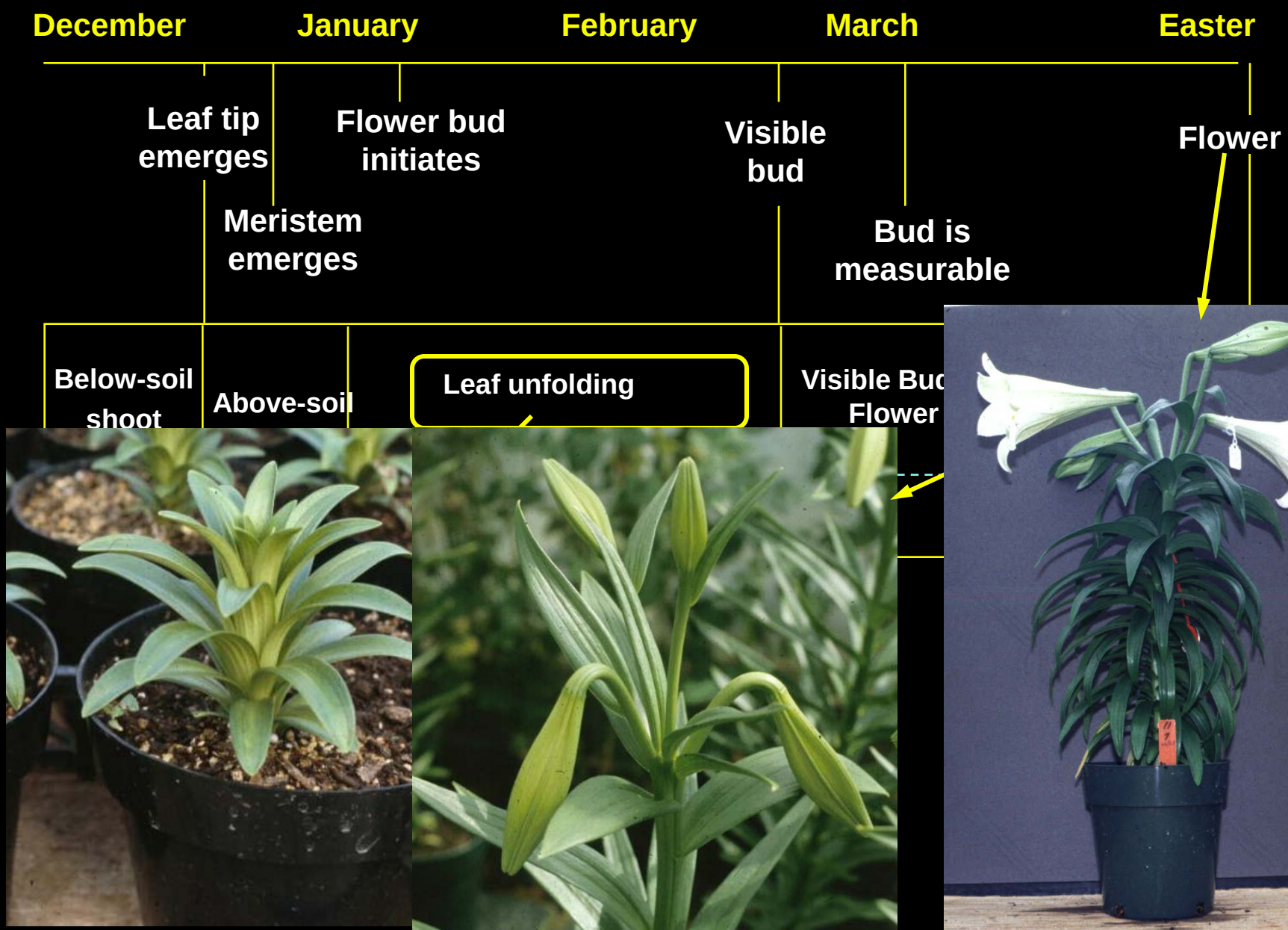
Easter Lily production

- Starts as field bulb production (3 years)
- Then a vernalization period (in a cooler)
- Then greenhouse forcing phase
  - Vegetative growth (December to 6 weeks before Easter)
  - Flowering (last month)

Easter lily crop development...



Easter lily crop development...



Easter Lily production

- Marketing
  - Easter crop
  - Note that marketing drives the production management
    - » Must have entire crop available for marketing period (two weeks before Easter)
    - » Must spread out flowering dates of plants over the entire marketing period to avoid paying excessive overtime for labor
    - » Need a way to cold-store plants that flower early (extra cost)
  - Note pros and cons of holiday crop:
    - » Pro: established market; the work is in getting crop to fit market
    - » Con: missing market can be very disastrous: Easter lilies are worthless after Easter – you cannot even give them away

Note that in the UCDavis course ENH125 (Winter quarter) you get to grow this plant (hands-on)

Potted chrysanthemum (a.k.a. “pot mums”)

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- Production method
  - Cuttings are taken from mother blocks
  - Either shipped to grower or rooted to be shipped later

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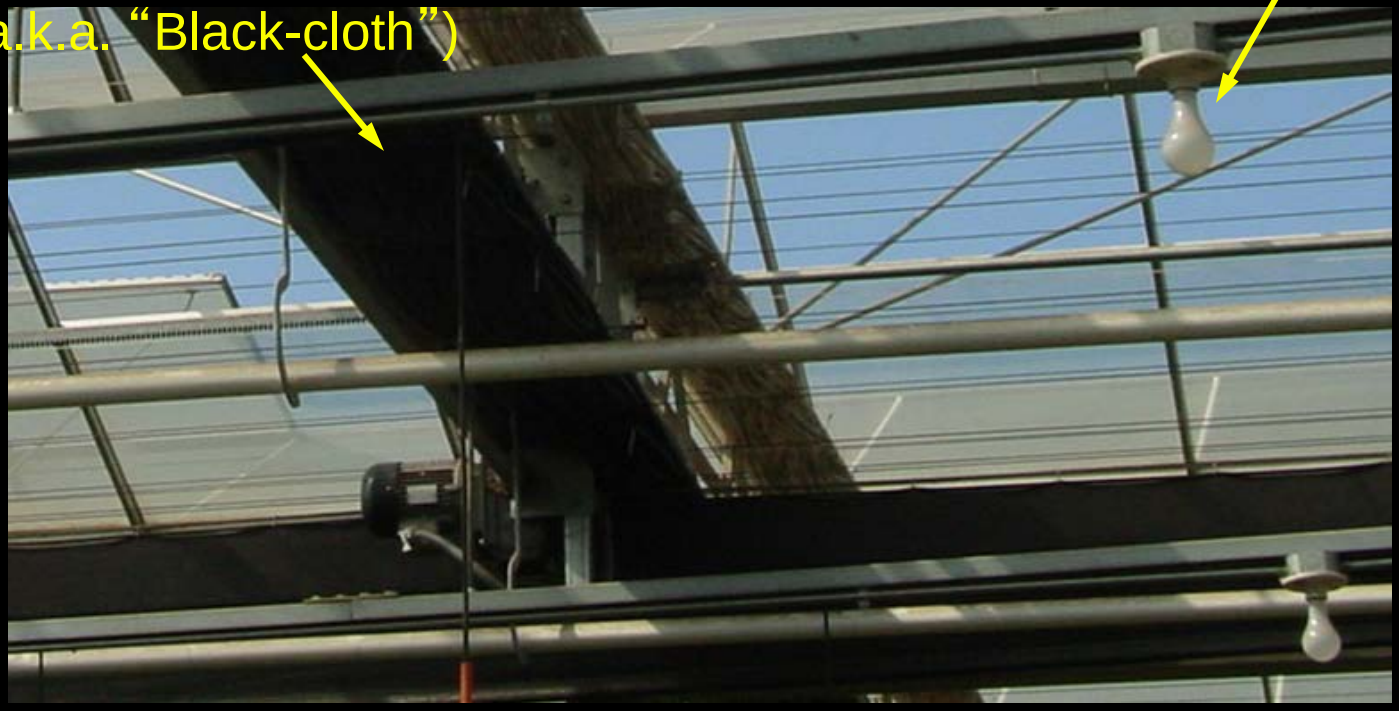
  - Cuttings are taken from mother blocks
  - Either shipped to grower or rooted to be shipped later
  - Plants are potted

Potted chrysanthemum (a.k.a. “pot mums”)

- Photoperiodic control
  - Plants initiate flowers if night (dark) period is long (uninterrupted)
  - Plants don’t initiate flowers if lights are used to interrupt night period or if night is short



Potted chrysanthemum (a.k.a. “pot mums”)

- Marketing
  - Mums are not attached to special holiday; I.e. year-round production
  - Advantage: grower can set up production space to always be in mums
  - Must adjust colors somewhat to fit time-of-year (this is somewhat linked to holidays)

Cut Rose Production

World-wide Perspective:

- mostly greenhouse production
  - types of greenhouses vary from simple to complex
  - mostly in areas where the climate is neither hot in the summer nor cold in the winter (if summer is hot then relative humidity must be low)
- in some places field production is possible
  - only in places where conditions are ideal (I.e. climate is such that plants don't go dormant)
  - quality is usually poor because of pests and disease damage due to precipitation, but cost of production is much lower

Cut Rose Production

US Perspective:

- almost entirely greenhouse production
  - types of greenhouses “medium”-level of technology to highly complex - depending on how cold it gets in the winter
  - mostly in areas where the climate is neither hot in the summer nor cold in the winter (if summer is hot then relative humidity must be low)

Cut Rose Production

California Perspective:

- almost entirely greenhouse production
  - types of greenhouses "medium"-level of technology to highly complex - depe
    the winter
  - mostly in areas where th
    the summer nor cold in
    then relative humidity must be low)
- field production for cut flower roses is rarely feasible in the US
  - most of production is targeted (e.g. for holidays) so that it is necessary to manipulate the climate to have the flowers available at the right time

Note: Our rose production areas don't have cold winters

Market

- the market drives how roses are produced
- strong fluctuations in demand (e.g. as in the US): the production must be geared to producing a lot of flowers on peak days
- strong demand all the time with lesser fluctuations at holidays (e.g. Europe), then less emphasis is placed on targeted production

Rose Production systems

- Rose production before 1990s
  - hedges
  - in greenhouse, in ground (amended soil)
  - good drainage system
  - roses are not the same as garden varieties
  - named cultivar is grafted onto a rootstock

Rose Production systems

- Prior to the 1990's
  - harvests are taken so that a piece of shoot remains with at least one 5-leaflet leaf
  - hedge gets taller and taller
  - during summer, when prices are down, hedge is pruned back

Rose Production systems

- Rose production in the 21st century:
  - bending / arching
  - hydroponics
  - (usually both)

Rose Production systems

- Rose production in the 21st century:
  - [illegible]
  - [illegible]
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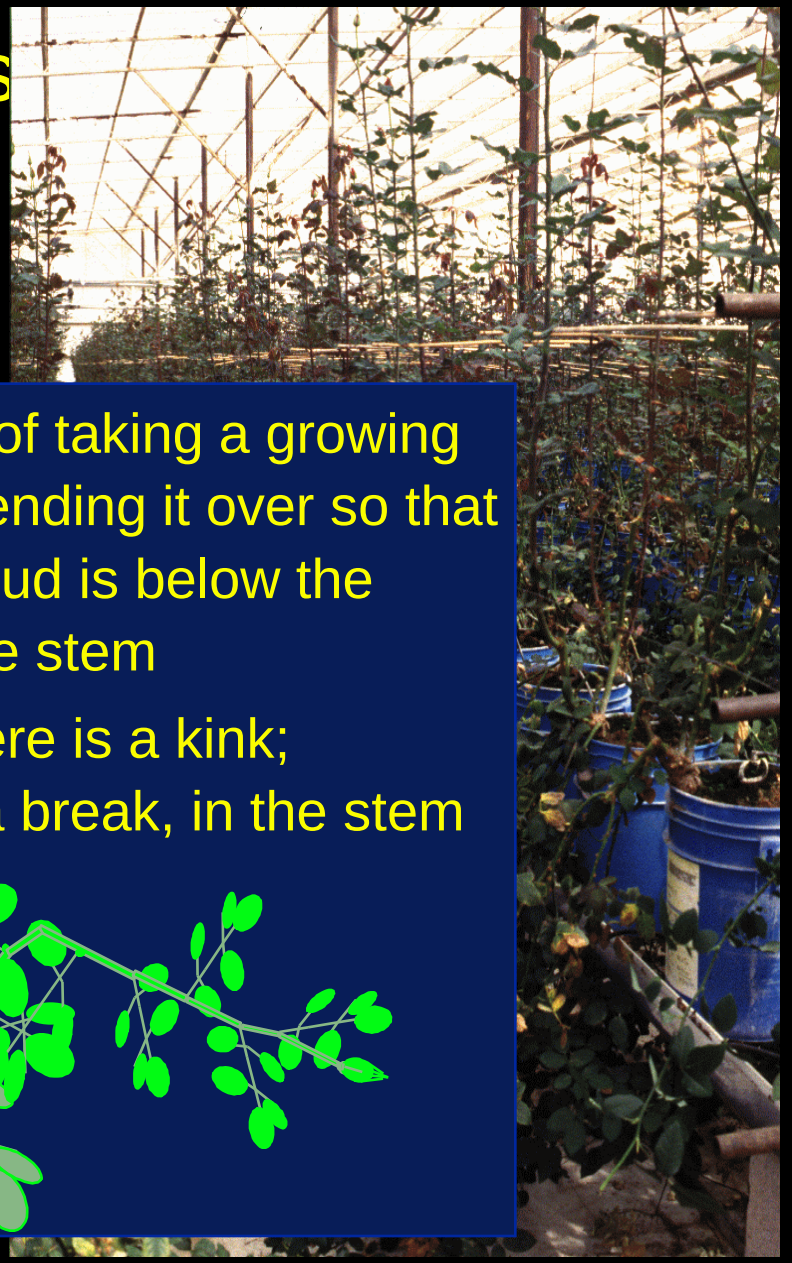
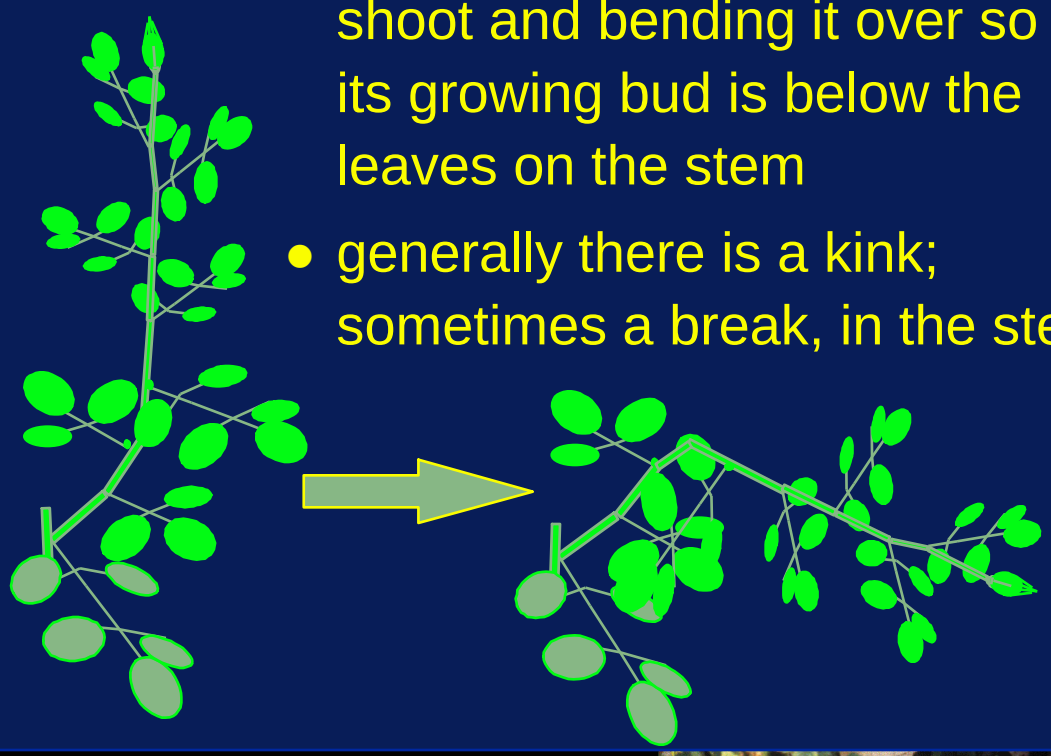


- the process of taking a growing shoot and bending it over so that its growing bud is below the leaves on the stem
- generally there is a kink; sometimes a break, in the stem



Rose Production systems

- Rose production in the 21st century:
  - bending / arching
    - » **Shoots that don't seem strong are bent down**
    - » **bent material stays (in the aisle) and contributes to generating sugars which the plant can use**
  - hydroponics
    - » **provides nutrients exactly when needed**

Rose Production system: bent canopy

note how uniformly the foliage covers the ground even in the aisles

Rose Production systems

- A “pinch” is made (on many plants) to create flush of flowers for holidays
- Temperature is controlled to time this flush correctly
- Supplemental lighting and CO_2 enrichment are used to increase production and quality
- Quality is measured:
  1. Stem length
  2. Stem thickness
  3. Flower size

Next lecture I will show you more details on cut flower production

Flowering potted plant production at

Rocket Farms in Half Moon Bay, California

Grows potted roses using a very advanced system:

Rocket Farms – potted flowering plants

- Visited with ENH125 field trip

Rocket Farms – potted rose plants

- Plants start in propagation: cuttings are stuck into pots

Rocket Farms – potted rose plants

- These trays of plants are moved into a greenhouse with lots of shading and misting to give the plants time to root

Rocket Farms – potted rose plants

- Highly automated potted rose production

Rocket Farms – potted rose plants

- Highly automated potted rose production
- This machine cuts tops off plants => cuttings

Rocket Farms – potted rose plants

- trays move every day

Rocket Farms – potted rose plants

- Robots space the plants out (distributing the pots from one tray onto two trays)

Rocket Farms – potted rose plants

- Glass greenhouse – note the lamps

Rocket Farms – potted rose plants

- Greenhouse production requires a lot of energy
- Heating is expensive in the winter

Rocket Farms – potted roses

- Automated spray for misting with water or perhaps pesticides

Rocket Farms – potted roses

- After several weeks of moving through the greenhouses the plants are ready to ship
- Packing into shipping boxes: