SEED GERMINATION ENVIRONMENT

Tree Seed Workshops - 2007:

Prince George - Civic Centre, Nov 20
Vernon - Prestige Inn, Nov 22
Kamloops – Best Western, Nov 23
Mesachie Lake – CLRS, Nov 26
Langley – Coast Hotel & Convention Centre, Nov 28

AFS Limited 250-478-8358 Michael.Peterson@afslimited.ca

ENERGY INPUTS

- NEED TO BE BALANCED!

GROWING & ENERGY

- Forms required
  - light
  - heat
- Placement of energy
  - proximity to "sink" absorbing energy
- Balance of energy forms
  - growth stage dependent

2 CONCEPTS

- Heat & germination
  - Q_{10}
  - uniformity
- DIF (Day/Night Differential) – following germination
  - How large?
  - How cold at night?

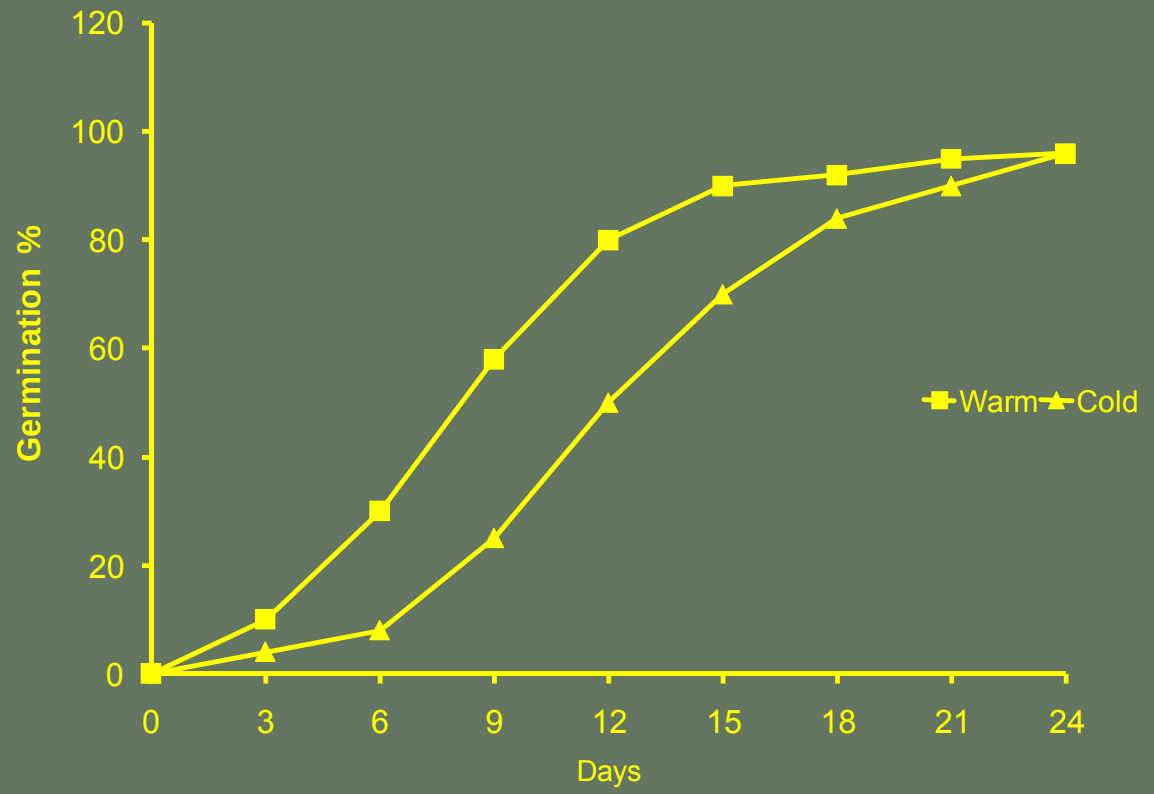
MAINTAIN UNIFORMITY AT GERMINATION PHASE

- Seed performance upgrading
  - Remove non-viables/low vigour
  - Resources concentrated on best seed
- Sowing strategies
  - Multiple sowing if needed – check pest info.
- Germination environment
  - Higher temps
  - Manage boundary layer climate (seed sfc.)
  - Focus on seed temp & moisture environment

WARM GERM. - BENEFITS

- Increased germination speed
- Establishes greater crop uniformity at start
- Pest escape – reduced incidence of pest intensification
- Shortens germination phase of crop cycle

Germination as function of temperature



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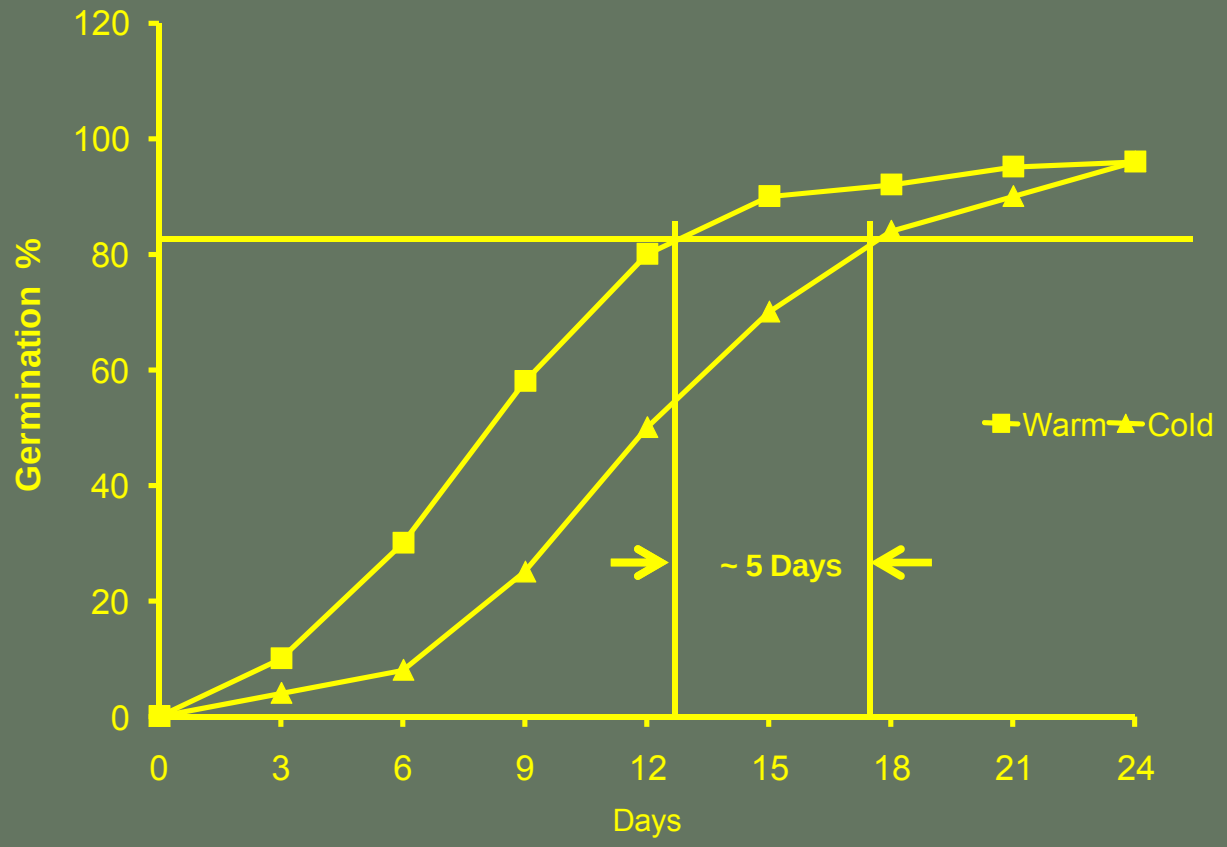
WARM ENVIRONMENT EFFECTS



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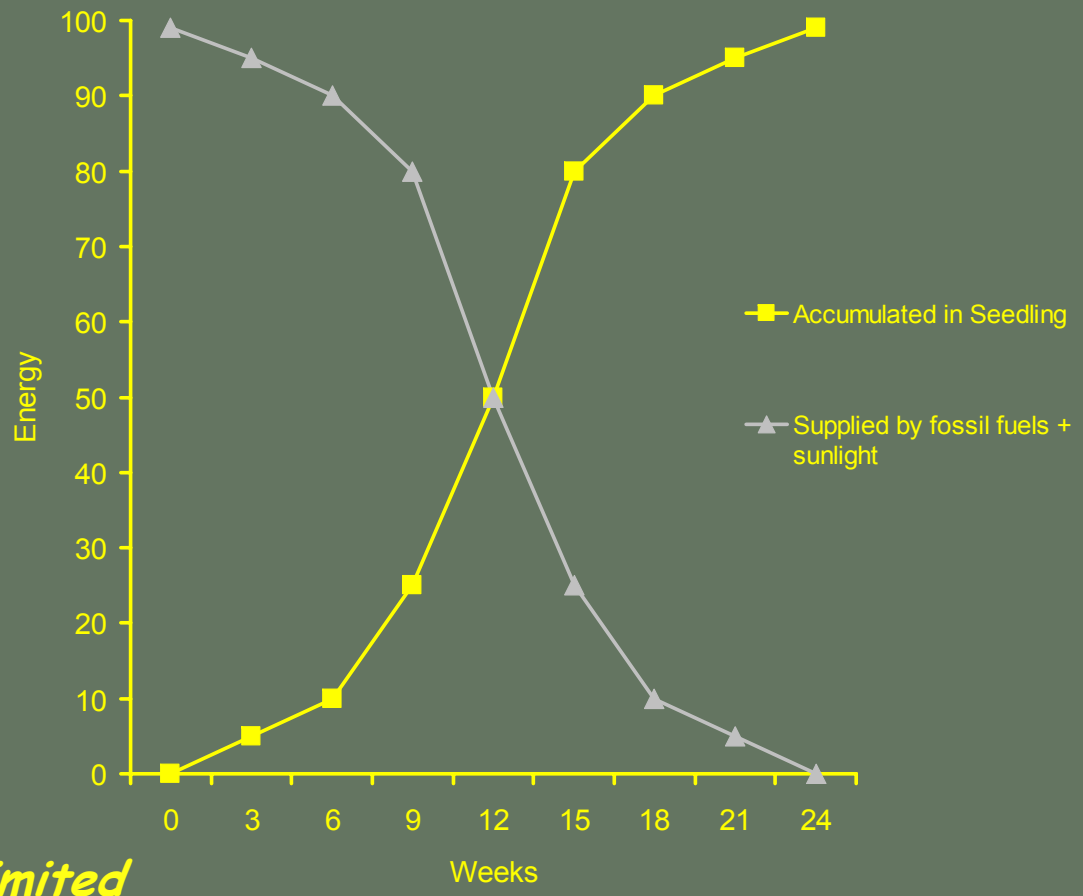
SEEDLING ENERGY



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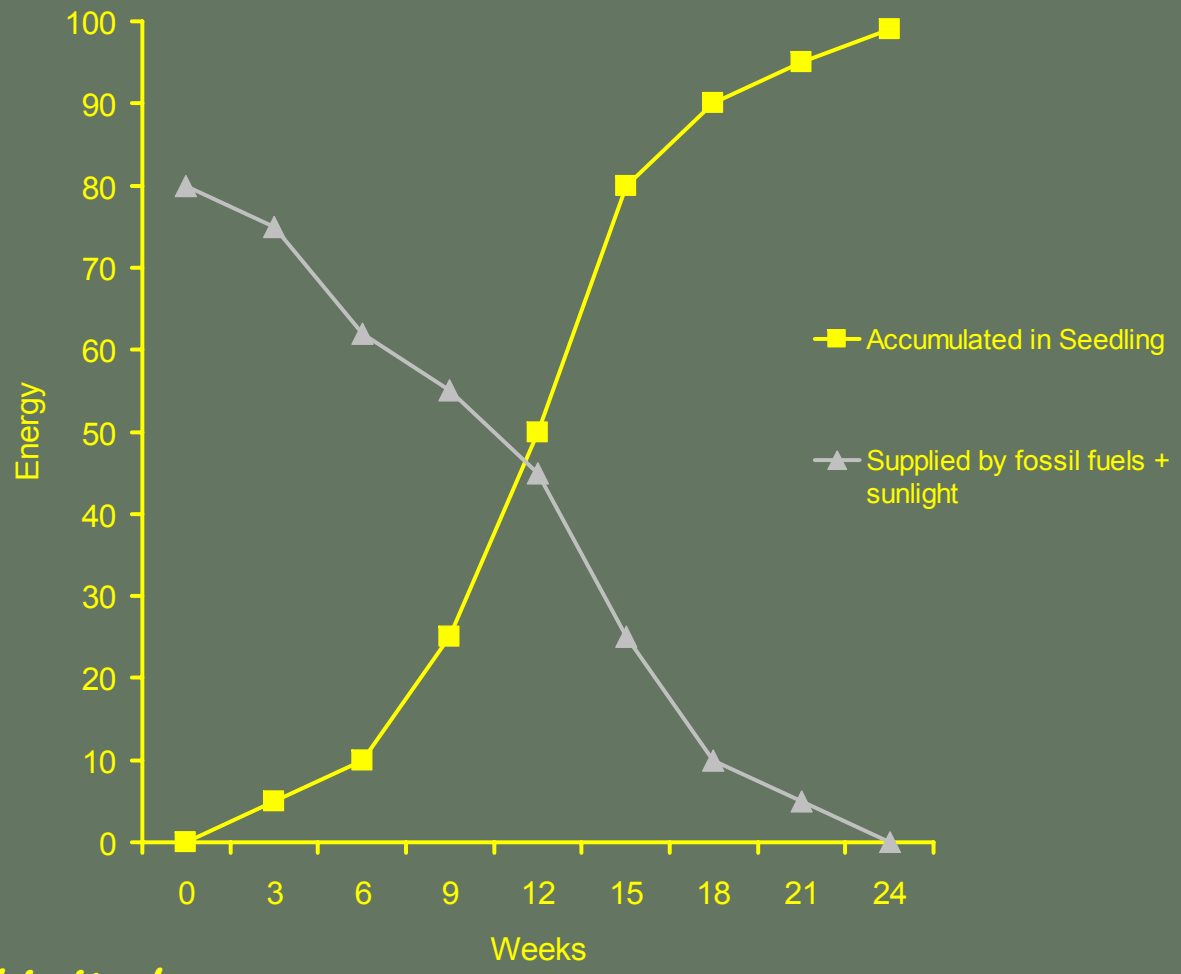

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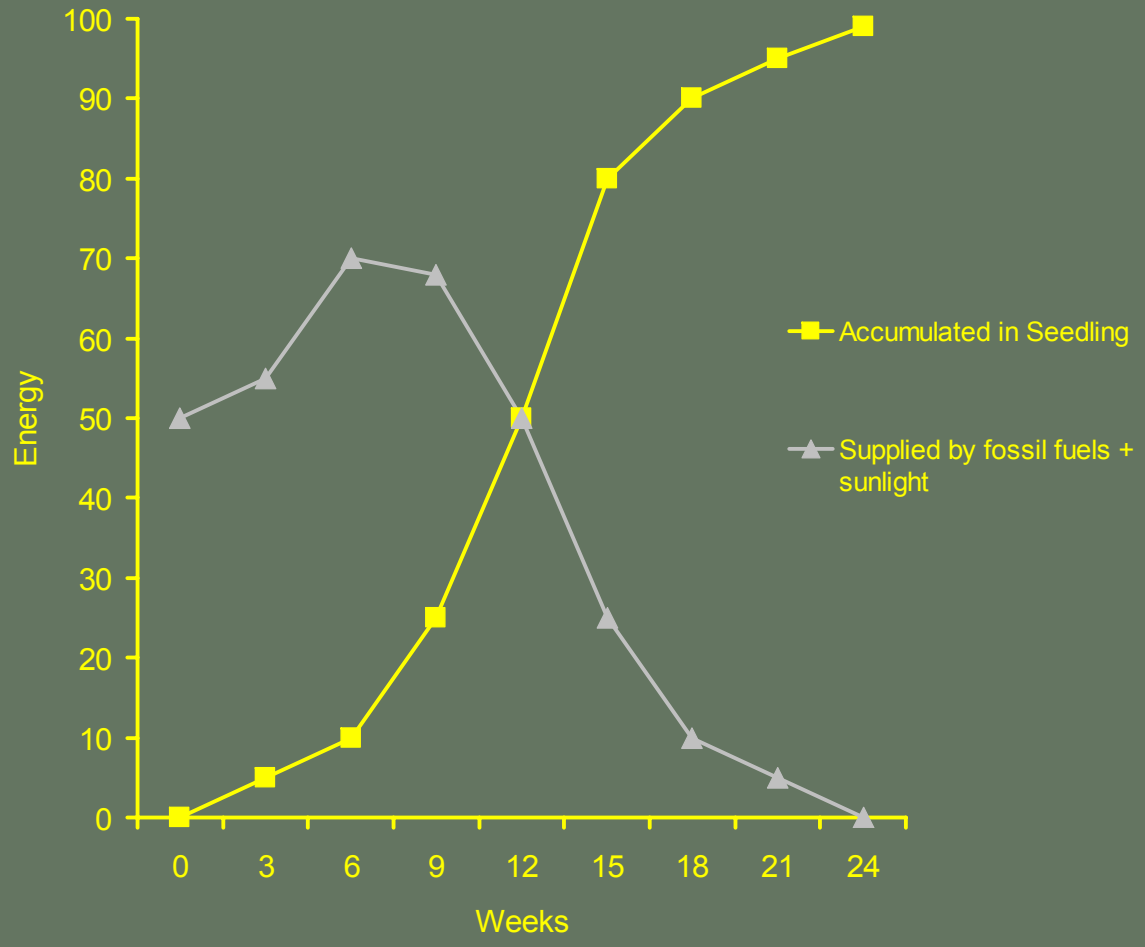

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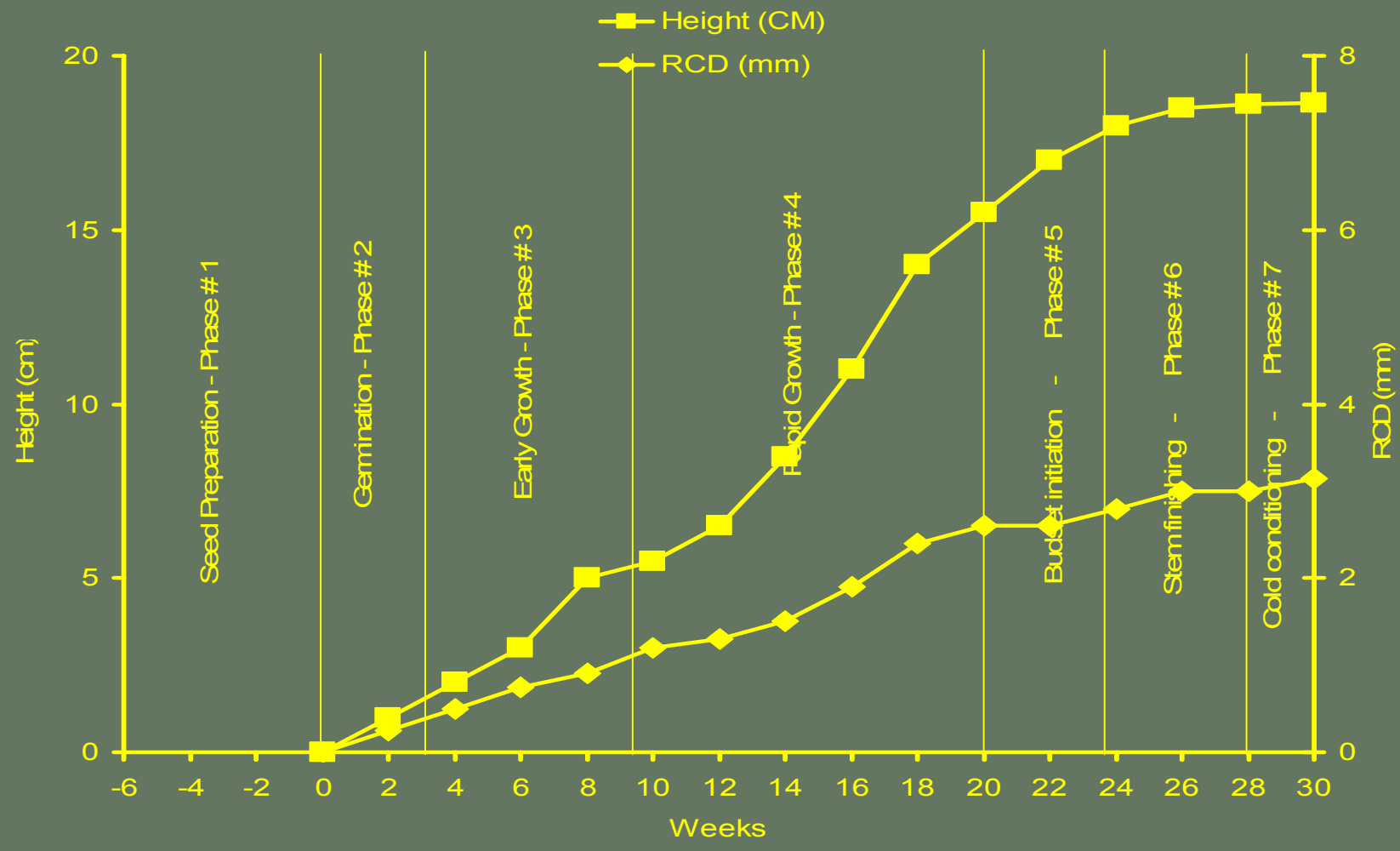
Growth Curve



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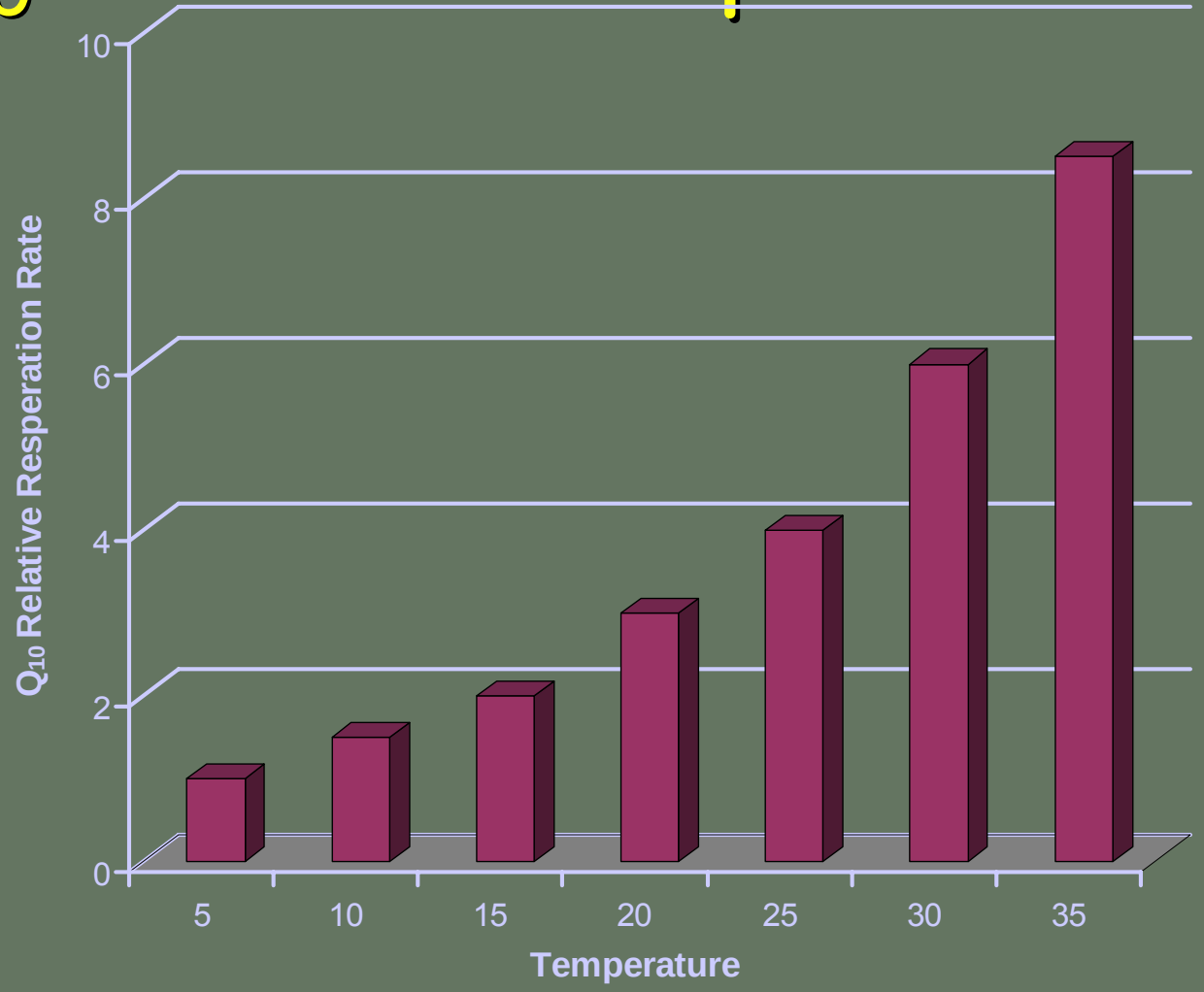
Q_{10} Relative Respiration Rate



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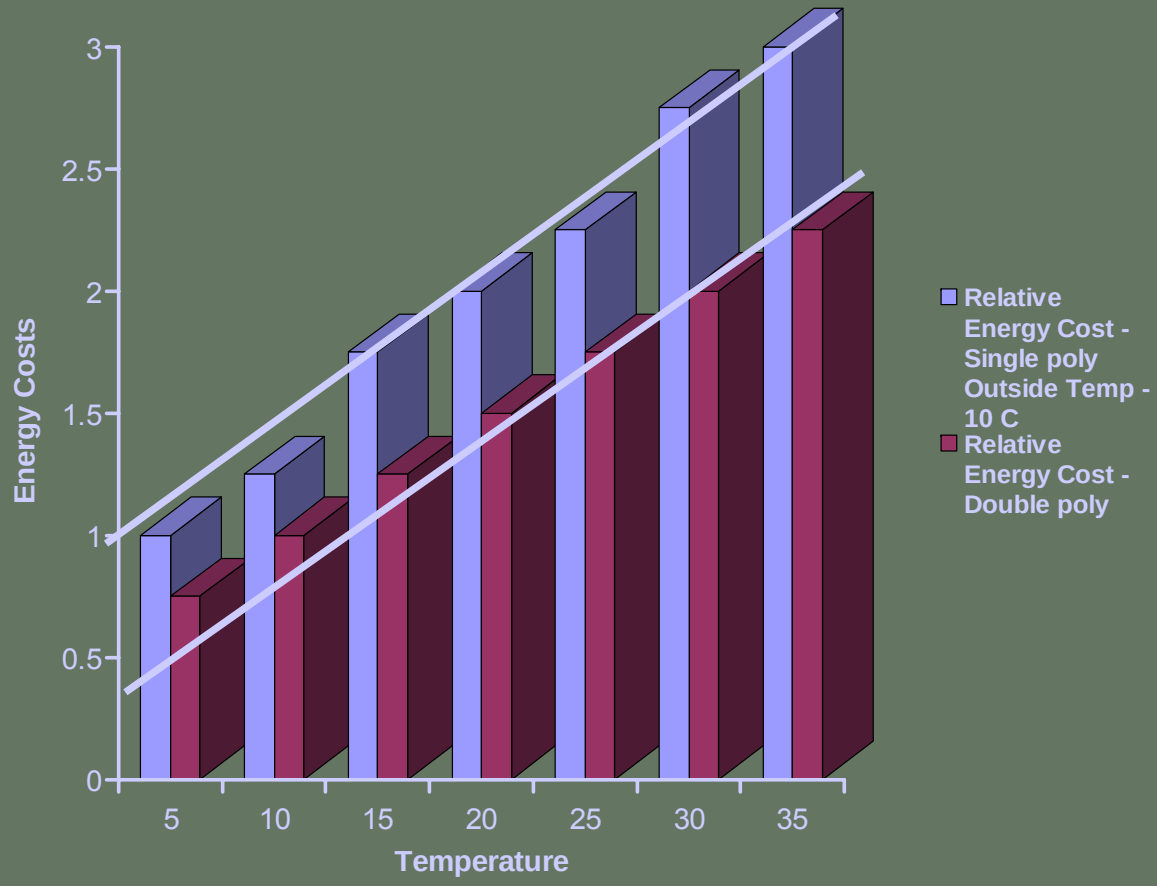
Q_{10} FOR GH HEATING



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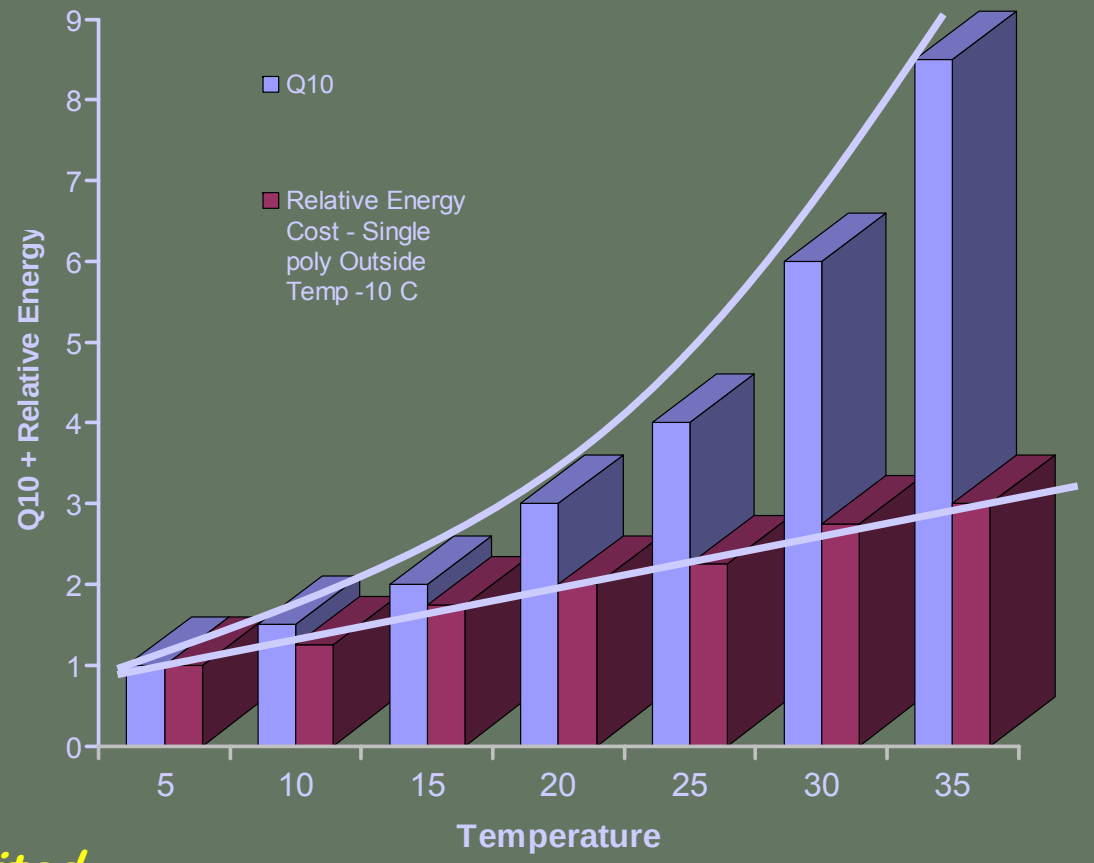
Q_{10} GH HEATING & RESPIRATION RATE



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DURING GERMINATION…… IT **PAYS** TO TURN UP **HEAT**!

- Increased germination speed
- Establishes greater crop uniformity at start
- Pest escape – reduced incidence of pest intensification
- Shortens germination phase of crop cycle

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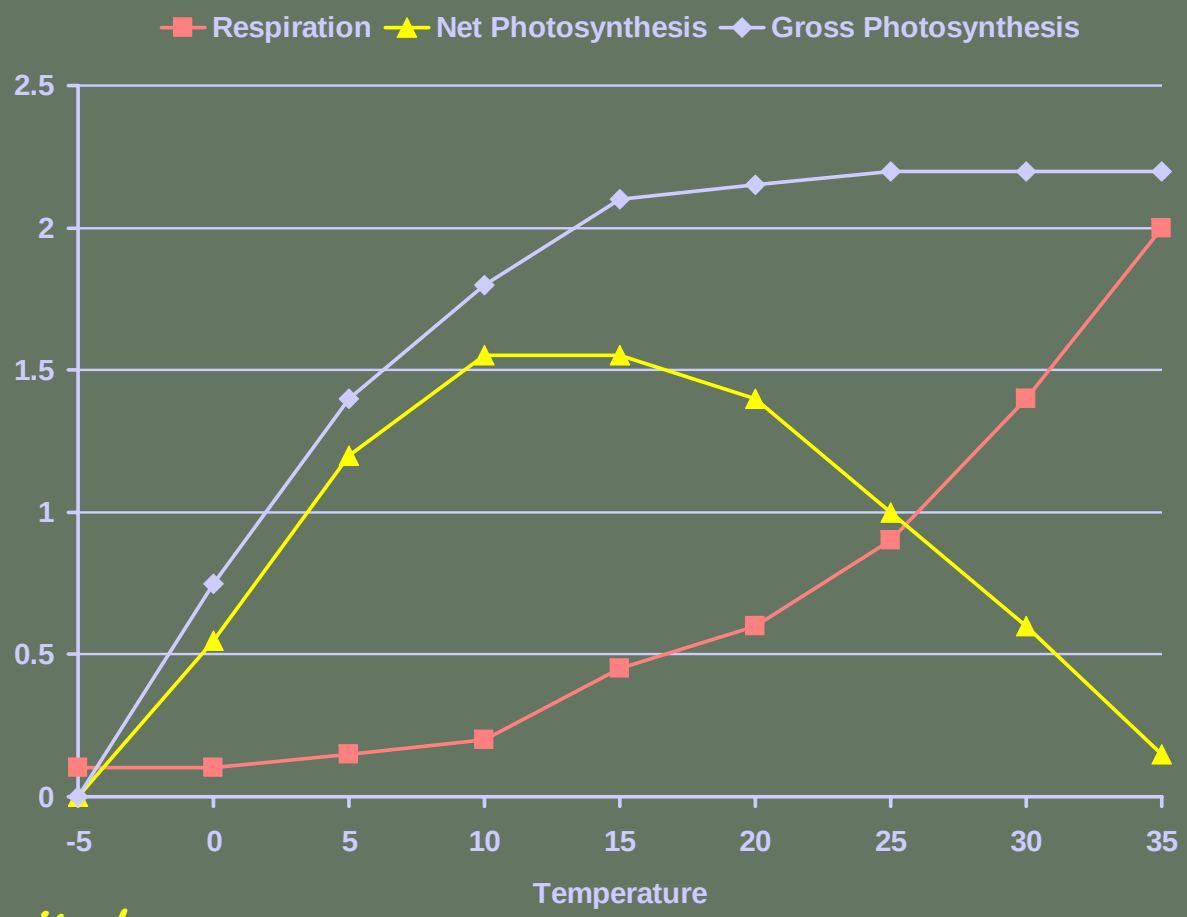
NET PHOTOSYNTHESIS - BRIGHT DAY



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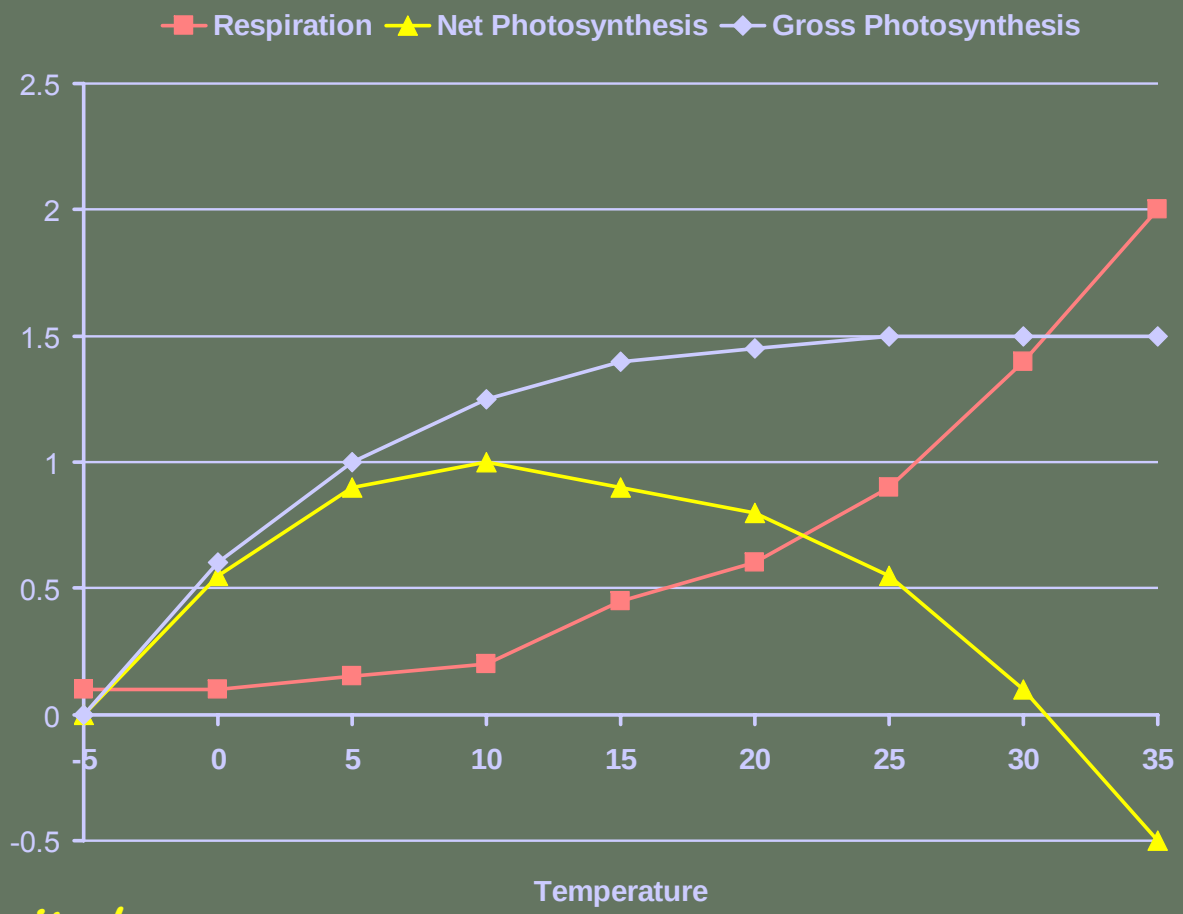
NET PHOTOSYNTHESIS - RAINY DAY



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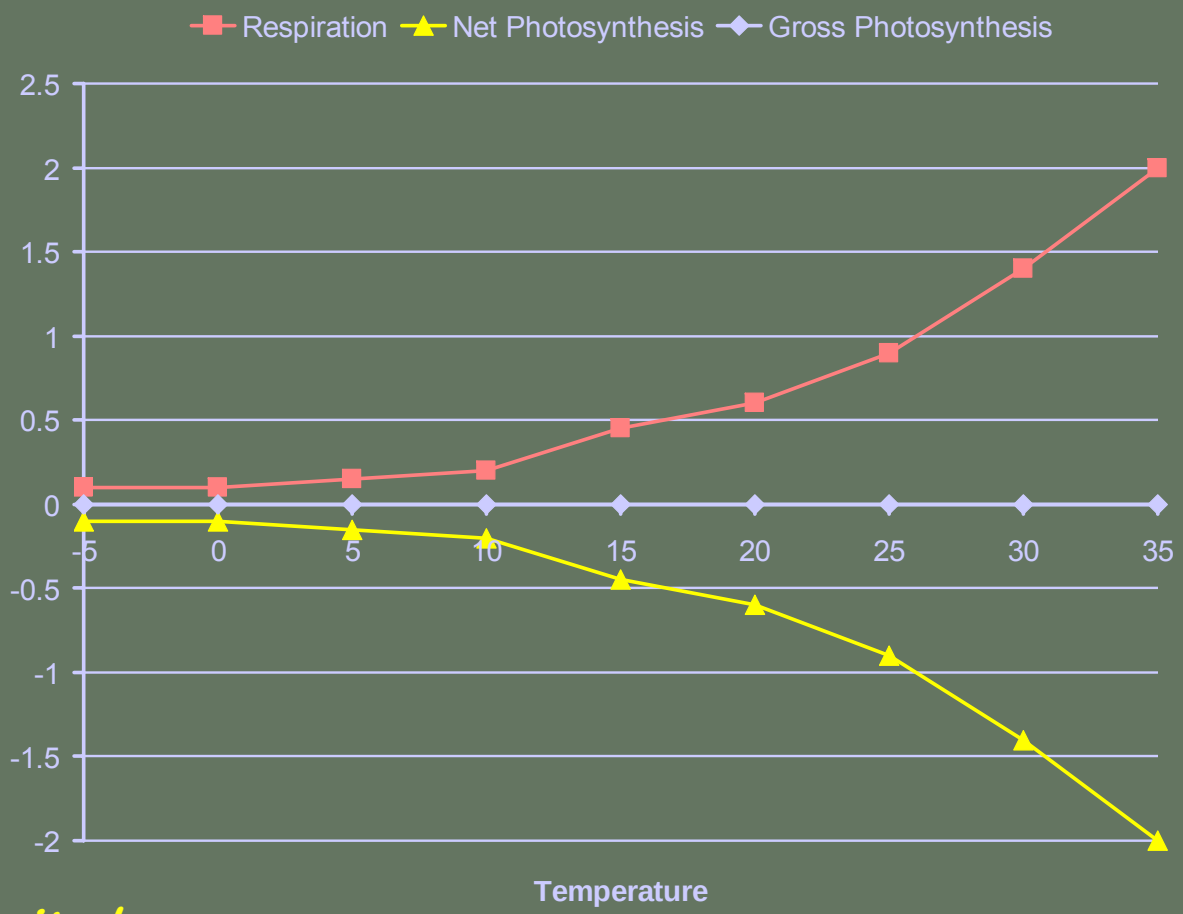
NET PHOTOSYNTHESIS - NIGHT



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DIF – A DAY/NIGHT TEMP DIFFERENTIAL

- Dif = day temperature – night temperature which leads to……
- Concept of "net growth" defined by…….
- Gross PS production – respiratory maintenance requirements

+ DIF DESIRABLE AFTER GERMINATION

- Reduces respiratory maintenance costs
- Light dependent temperature controls
- Low to mid-teens vs high teen (^{O}C) night temperatures
- Achieve with evening ramp-down and night set-point based on preceding day (light) conditions

FUSARIUM - 5% OF SEEDLOT

- Running water soak for seed imbibition
- Sanitize seed handling equipment
- Encourage rapid germination – avoid heat stress
- Avoid heat or water stress during seedling growth
- Sanitize growing containers

CALOSCYPHA – 5% OF SEEDLOT

- Sow non-strat. seed – need to balance
  - even germination – infection intensification
- Avoid multiple sowing if possible
  - reduces contact between seeds
- Avoid cool, moist germination
  - slow germ. but fungus can still spread
- Encourage rapid germination with heat

SIROCOCCUS – 1% OF SEEDLOT

- Single sow seed if possible
- Avoid mixed species in greenhouses
  - infected Sx can spread & infect Pl
- rogue infected germinants
  - pull & **destroy** plants
- **No** infected germinants in cull piles
  - spores still released & infect healthy trees