Planning a Fall Garden Mum Fertilization Program

Neil Mattson

Assistant Professor and

Floriculture Extension Specialist

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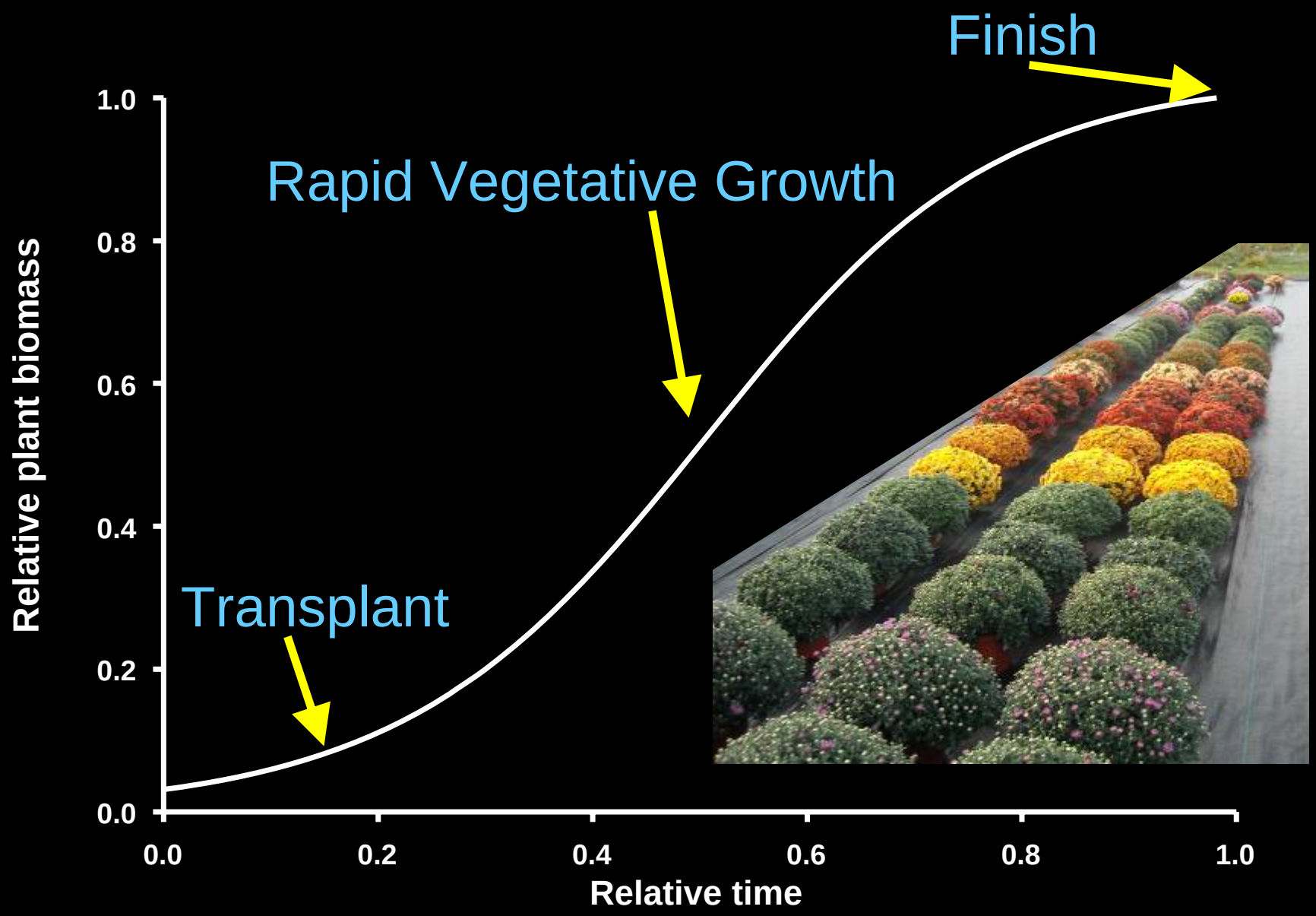
The Good

Fertilize to match plant growth



The Plan – Constant Liquid Feed

- Initially
  - 200-300 ppm N with 20-10-20, 20-20-20 or 15-5-15, etc.
  - High side for mixes with bark
  - less than 200 ppm N if controlled release fertilizers are also used
- Once plants are actively growing:
  - Rotate in 15-0-15 every third watering
  - Helps to control stretch

The Plan – Constant Liquid Feed

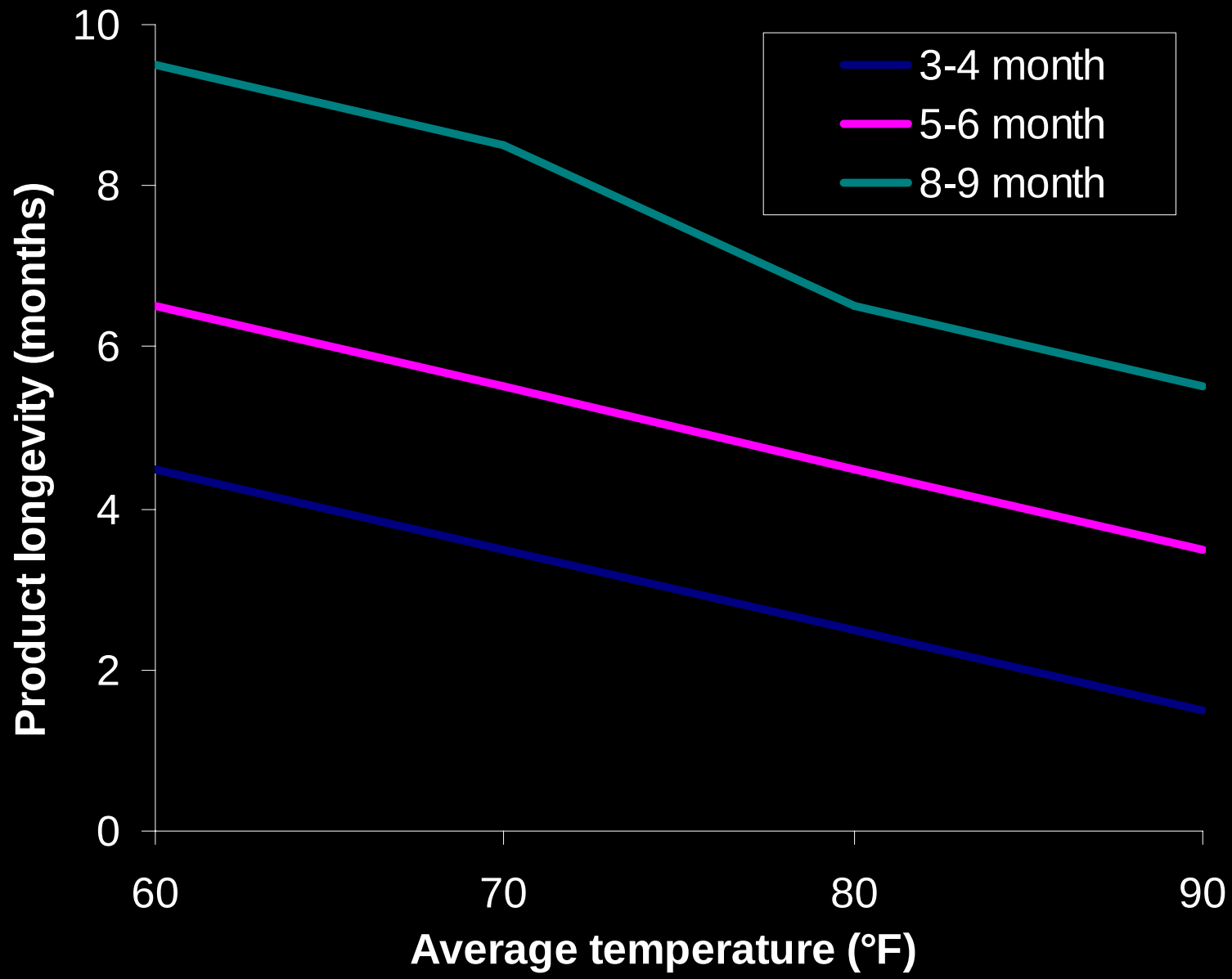
- Once buds appear:
  - Use 15-0-15 continuously
- Pea-sized buds:
  - Clear water only

More thoughts…

- Following rainy weather– give them a boost
- Reduce feeding during extreme heat when plant growth shuts down
- Push vegetative growth immediately following transplanting/cool weather – fertilize well to avoid premature budding

Controlled Release Fertilizers

Temperature controls rate of release



Using Controlled Release Fertilizers for Mums

- Less control
  - initial may not be enough
  - can't slow-down release at the end
- Top dressing/incorporated at medium-high rate
  - 14-14-14, 15-9-12, etc.
- Distribute evenly so one spot doesn't get burnt; make sure prills are moistened at each watering
- Make sure micros are included when using a soilless mix
- If using incorporated CRFs - use within one week of mixing; otherwise salts can accumulate and can burn roots

Other Considerations

- During cold temps may need to supplement with liquid feed to push vegetative growth
- 3-4 month formulations can run out early (high temps)

Chrysanthemum CRF/WSF Experiment

Cultivar ‘Coparo’

CRF Only

2 wks WSF

4 wks WSF

6 wks WSF

CRF + WSF

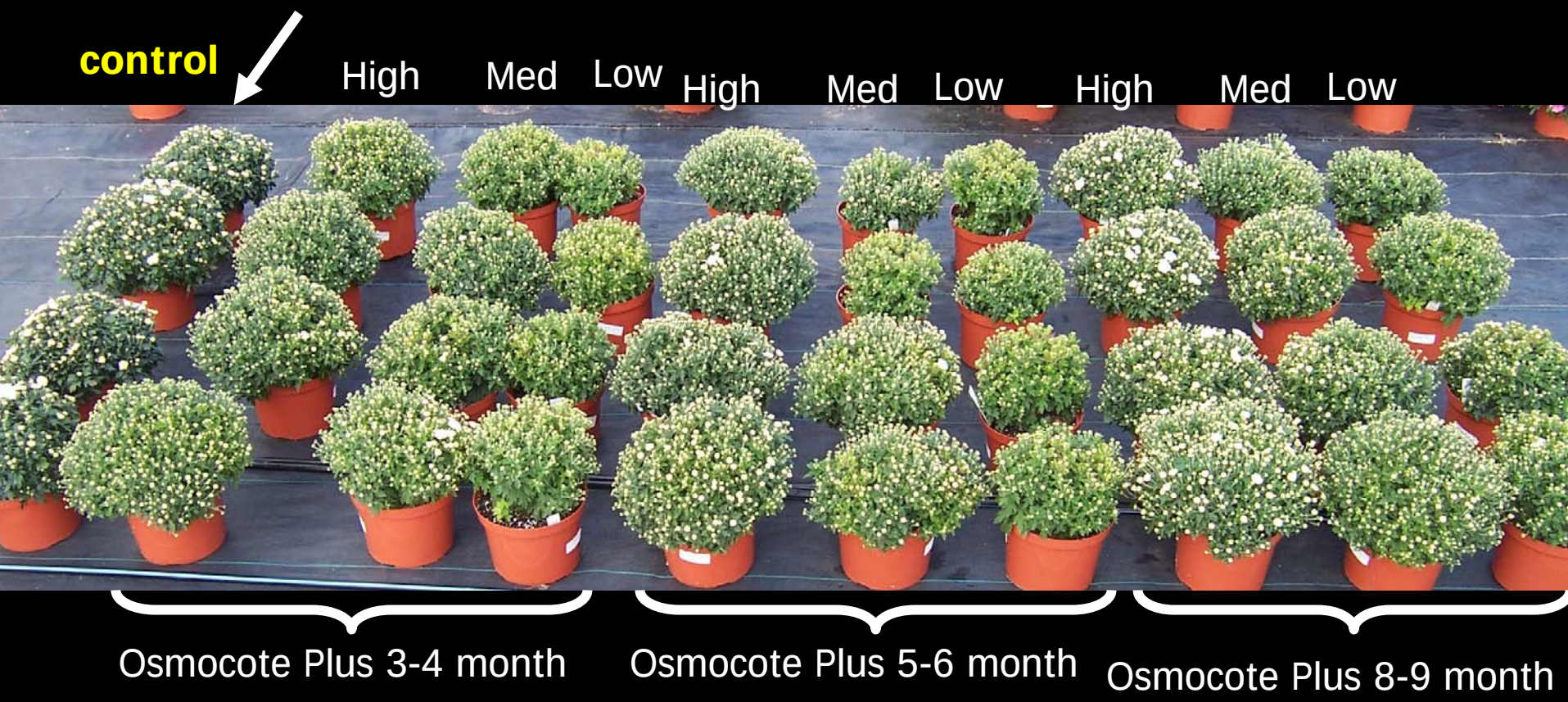
Control: Liquid Feed Only

Osmocote Plus 8-9 Month

Source: Mark Bridgen

Combination of CRFs with a Liquid Feed Program

- Research by Dr. Mark Bridgen
- CRF only plants (with an 8-9 month product) were not as large as constant liquid feed plants
- However using liquid feed for the first 4-6 weeks then only media incorporated CRF gave growth nearly as large as constant liquid feed plants



Research by Dr. Mark Bridgen

- Testing 3 different rates of media incorporated CRF (Low, Medium, High)
- And 3 different release periods (3-4, 5-6, and 8-9 month)
- Using the High rates suitable plant size was found

CRF Recommendations

- You CAN grow a mum with 100% Controlled Release Fertilizer.
- Use higher rates: 10-14#/cu.yd
  - ie, 28-39 g/9”pot
- Or use a lower rate, if a smaller plant form is desired
- Use the 8-9 month formulation
- If your mums are looking yellow at the end, hit them with a liquid feed about 10 days before sale.

‘Sparkle White’

Source: Mark Bridgen

Are you on track?

- Periodic pH and EC (salt) monitoring is recommended

- pH: 5.5-6.4

- EC (dS/m)

	SME	PourThru
– Establishing	0.8-1.5	1.0-2.0
– Transplant/Vegetative	1.7-3.0	2.3-4.0
– Finishing	0.8-1.5	1.0-2.0

Of Note:

- Avoid water stress – can reduce flower size and delay flowering
- Low fertility can cause poor plant size and buds not developing on schedule
- High fertility can cause root tip burn and delay flowering

The Bad

Low Fertility

Low Fertility - P

The Ugly

Guidelines for foliar analysis values for Chrysanthemums

Samples from the top-most fully expanded leaves

Nitrogen (N)	4.0 – 6.5 %
Phosphorus (P)	0.25 – 1.0 %
Potassium (K)	3.5 – 6.5 %
Calcium (Ca)	0.5 – 2.0 %
Magnesium (Mg)	0.3 – 0.6 %
Boron (B)	25 – 100 ppm
Copper (Cu)	5 – 50 ppm
Iron (Fe)	50 – 300 ppm
Manganese (Mn)	30 – 350 ppm
Zinc (Zn)	15 – 50 ppm

Source: Plant Analysis Handbook for Georgia, 1988

Iron Chlorosis

Correcting Iron Chlorosis

- A problem at high substrate pH which causes iron to be poorly soluble
  - correct Substrate pH
  - nitrogen form (ammonium decreases pH)
  - acid injection
- Drench with Iron chelate
  - Solubility depends on pH
    - Iron-EDDHA > DTPA > EDTA > Iron Sulfate
- Foliar spray of Iron
  - Watch out for phytotoxicity!
  - wash foliage soon after applying

Magnesium deficiency

- 20-10-20, 20-20-20 15-0-15 have very little Magnesium
- A problem at low pH (Mg unavailable) and not present in water source/fertilizer
- Typically a problem when alkalinity is low
  - not present in the tap water
  - low alkalinity → low pH
- Supplement with epsom salts (Magnesium sulfate)
  - Continuous
  - Every month

Pythium induced nutrient deficiency

Pythium

Healthy

Pythium

Healthy

Questions? Neil Mattson nsm47@cornell.edu

Online: http://www.greenhouse.cornell.edu

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