Lima Bean Production in Wisconsin

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Lima Bean Origin

- • *Phaseolus lunatus*
  - Lima, sieva or butter bean
- • *Similar to P. vulgaris*
  - Much more sensitive to climatic extremes
- • *Production in protected areas*
  - California, Delaware and Wisconsin

Lima Types

- *Mesoamerican types*
  - 1) Hopi or Northern branch
  - 2) Caribbean or West Indies branch
  - Smaller seeded
- • *Andean (Inca or Southern branch)*
  - - larger pods and seeds
  - - Fordhook types

Objectives

- Field selection for Lima Bean
- Field preparation and planting
- Growth and development
- Fertility
- Weed Management

Field Selection

- Limas are sensitive to multiple soil born diseases
- Success of the crop depends on stand establishment
  - Large seeded plant
  - Requires warm temperatures for growth
  - Long season crop with slow vegetative growth
  - Vigorous and extensive root system
- Sensitive to wet or compacted soil conditions

Field Selection (cont.)

- Well drained soils
- Medium to light loamy/coarse soils
- High organic matter content
- Avoid fields with chronic weed issues
  - Perennial weeds
  - Difficult annual weeds – sandbur, nightshade
- Avoid fields with history of white mold

Crop Rotation

- Avoid growing limas more than once in 3 yr
- Don't plant host crops for white mold or root rot disease complex
- Design rotation to manage weeds
- Many potential lima bean fields include soybean as part of the rotation
  - Plant at least 1 year of corn between soybean and lima beans

Field Preparation

- Firm, friable soil that will allow for rapid germination
- Most lima beans are clean tilled
- Heavy soils should be chiseled or deep tilled the fall prior to planting lima beans
- Avoid excess tillage
  - Crusting and compaction can inhibit yields

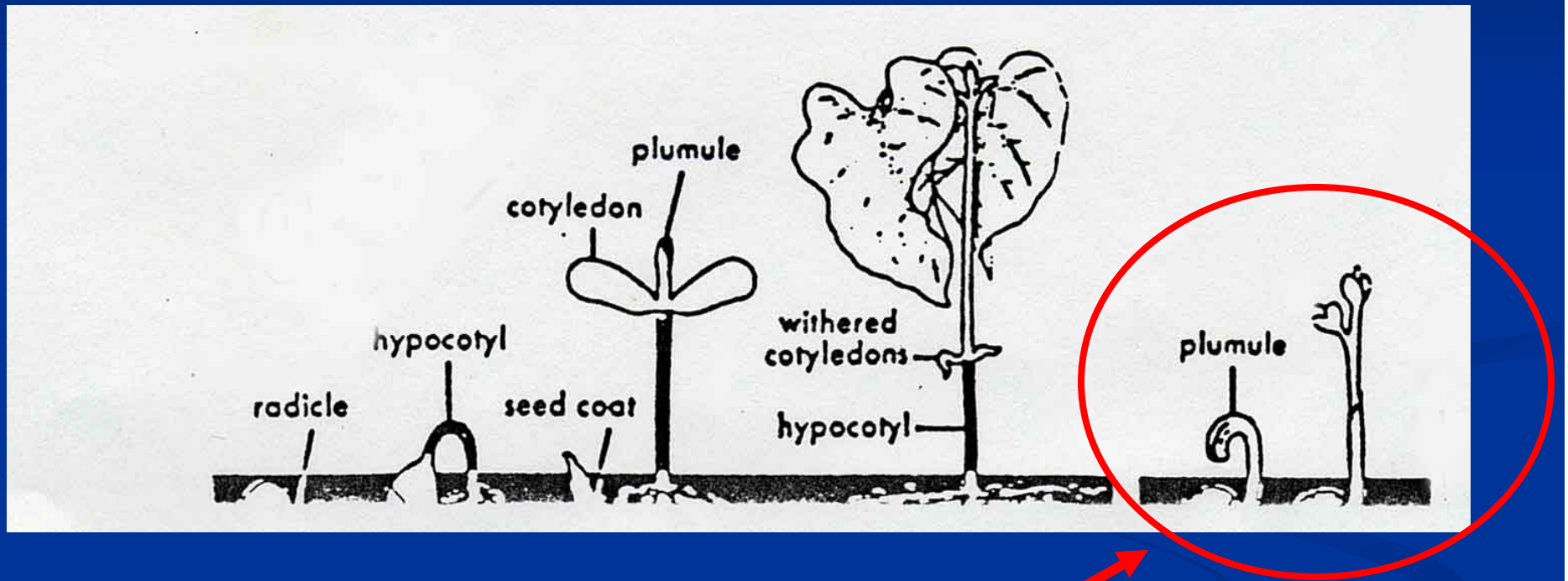
Seeding

- Plant lima beans after soil temperatures exceed 65 F
  - Minimum of 60 F
  - Optimal is 75 – 85 F
- Lima bean seed can be brittle
  - Avoid causing damage to seed
  - Adjust planter and planting speed appropriately
- Plant into moist soil
  - Ideally 1 – 1 ½”
  - Maximum of 2”
- Plant treated seed
- Minimum of 80% germination rate

Planting Rate

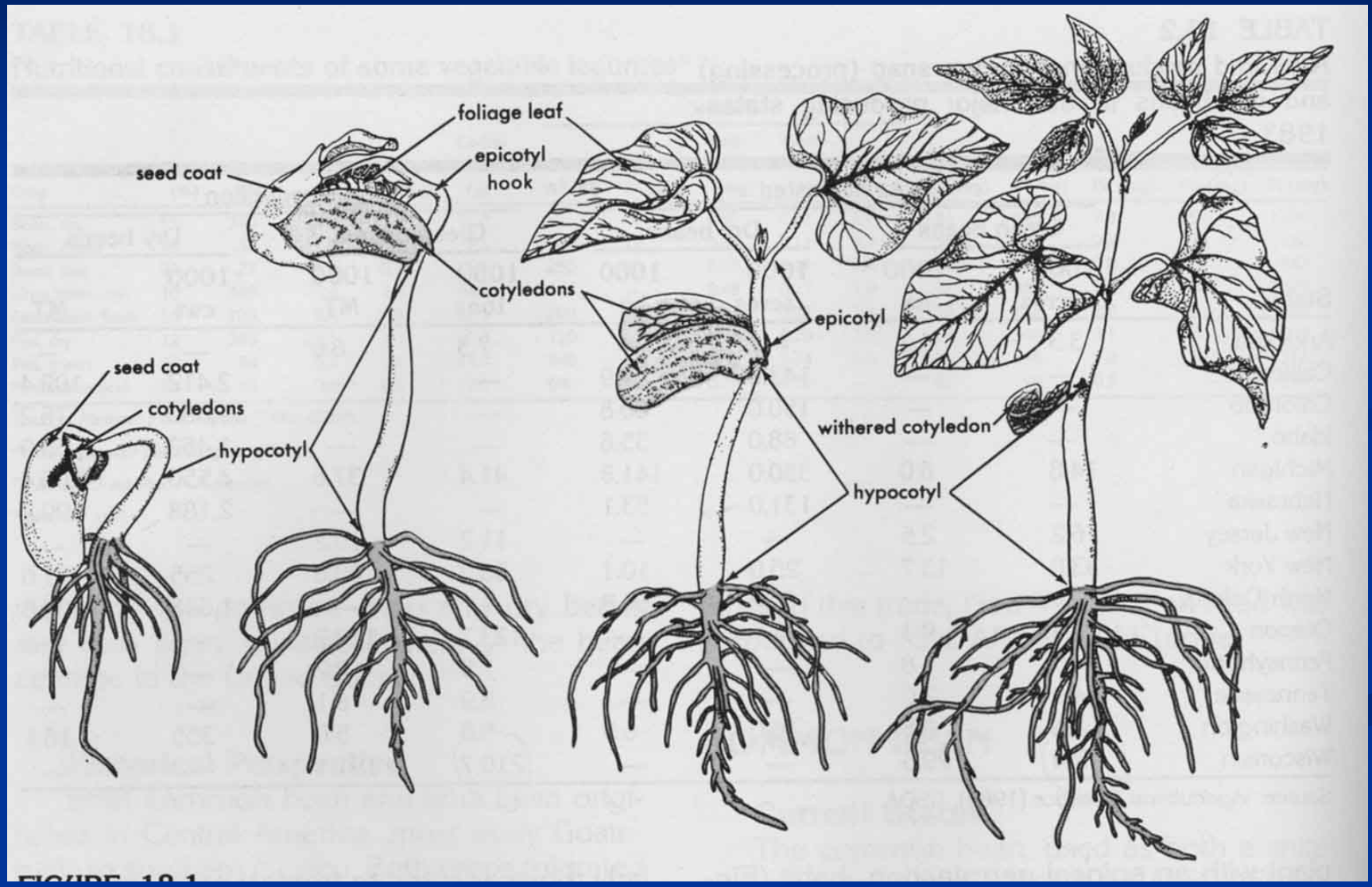
- Row spacing varies
  - 12” spacing
    - Improved canopy cover – better weed control
    - Increased risk of white mold
  - 30-36” spacing
    - Longer time to canopy closure-increased reliance on cultivation or herbicide
    - Decreased risk of white mold
- Planting population
  - Target stand of 100,000 plants/a
    - 30” spacing = 5-6 plants/ft
    - 12” spacing = 2-3 plants/ft
  - Adjust seeding rate
    - germination

Epigeal Germination



Note: Pea germination hypogeal cotyledons below ground

Early Growth



Lima Bean Growth and Development

- *Growth habit*
  - Bush (determinate)
  - Pole (indeterminate)
- *Culture rel. to snaps*
  - less sensitive to drought
  - longer growing season (65 vs 80+ days)
  - slower to germinate
  - Optimum temp for growth is higher
- Blossom and pod development sensitive to stress

Sensitivity to Drought
(Irrigation Management)

- Moisture critical during emergence and seedling establishment
  - Avoid irrigation during crop establishment
  - What if heavy rains occur after planting
    - Harrow or rotary hoe to break crust UNLESS HOOKING
- Plant less sensitive to water shortages during vegetative growth
  - Irrigation less important
  - Adjust potential ET based on row closure
- Water shortages during reproductive phase cause largest yield effects
  - Flower/blossom abortion or pod drop
  - Irrigation key – schedule based on moisture received and daily ET rates

Fertility

- Ideal pH is 6.5,
  - Minimum of 6.0
  - Use lime to amend pH – several months prior to planting – Dolomitic to supply Mg
- N – based on OM content of soil
- P,K based on soil test recommendations
- Micronutrients – soil and plant tissue analysis
  - Zn, Mn

Soil Fertility

Lima bean is a legume – What is the value of nodulation

Effect of Applied N

Base Fertility Program

- Nitrogen
  - Application rate depends on soil type and organic matter content
    - Ranges from 60 to 100 units of N (0 to 60 recommended)
    - Credit other sources of N
      - Rotational crops, manure, other amendments
    - Over application of N can reduce yields
      - Rank vines
      - Promotion of white mold
  - Application timing
    - Some N in starter
    - Side dress the remainder of the N
  - N Source –
    - Ammonia form may promote root rot issues

Starter Fertilizer

- Part of N and all of P and K
  - Well adapted technique in 30-36” rows
  - 12” row spacing?
- Appropriate micros
- Place to the side and below the seed row
- Minimize salt effects on seedling plant

Questions?

Weed Management

- Overcome slow open canopy and long growing season
- Manage perennial weeds prior to lima beans
  - RR soybean
  - Fall herbicide applications
- Mechanical weed control
  - Stale seedbed techniques
  - Rotary hoeing prior to crop emergence
  - Cultivation (1-2 times per year)
    - Target small weeds
    - Shallow to minimize root pruning
    - Use hilling of soil around row to smother emerged weeds
      - Can cause some disease development

Rotation Crop Restrictions

- Be aware of herbicide use preceding lima beans
- Commercial Vegetable Guide (A3422) has list of rotation restrictions by herbicide
- Key ingredients
  - Atrazine, Balance, Callisto, Harness/Surpass and others

Standard Program

- Pursuit Plus (30 oz/a)– apply PPI 1 wk prior to planting
  - broad spectrum of annual grass and broadleaf weeds
- Basagran (1.5-2 pt/a) – Postemerge at 1st trifoliate with 1 qt/a COC
  - Repeat application – up to 4 pt/a total (spot trt)
  - Good on velvetleaf, mustard, purslane
  - Activity on black nightshade, COLQ, RR pigweed
    - Apply when very small
- Poast (0.5-2.5 pt/a with COC) or Assure II (6-12 oz/a with NIS) – post-emergence to actively growing grasses
  - DO NOT TANK MIX Assure with BASAGRAN
    - Apply 1 day before or 7 day after Basagran

Command

- 0.4 to 0.67 pt/a – new formulation applied pre-emergence prior to seeding
  - No longer requires incorporation
  - Place seed below treated zone
  - Good control of several broadleaf and grass species
  - Disclaimer statement for vegetable crops

Alachlor (Lasso) and Dual

- Preplant or preemergence (see label for rates)
  - Good annual grass weed control
  - Small seeded broadleaf weeds

Prowl and Treflan

- Preplant incorporated (1” for Prowl, 2-3” for Treflan
  - Annual grass weeds and some small seeded broadleaves

Sandea

- 0.5 – 1.0 oz/a – preemergence after planting, but before cracking.
  - Do not follow with OP insecticide
  - Several broadleaf weeds and nutsedge
  - Limited use history or experience with the product

Read Labels Carefully

- Some products are labeled for dry bean production
  - Includes lima beans
- NOT LABELED on PROCESSING LIMA BEANS
  - Outlook, Eptam, Sonalan, Raptor

Efficacy 2000

			vele	colq	rrpw	bygr	gift	yeft	Injury	Yield
	rate	Time	% control (7/25)						7-Jul	ton/A
Prowl 3.3 EC	2.5 pt/a	PPI	70	73	88	93	100	100	0	1.1
Command 3 ME	0.67 pt/a	PRE	100	80	78	100	100	97	0	1
Basagran 4 EC +	2 pt/a	PO1	100	100	82	100	100	100	0	1.4
Poast 1.53 EC	23 oz/a	PO 2								
Check										0.1

Efficacy (2001)

			vele	colq	copu	rrpw	bygr	yeft	Injury	Yield
	rate	Time	% control							ton/A
Treflan 4 EC	1 pt/a	PPI	92	98	100	95	98	88	0	0.9
Prowl 3.3 EC	2.5 pt/a	PPI	93	100	100	95	97	88	0	0.9
Check										0