LIMA BEAN MANAGEMENT FOR WISCONSIN

Alvin J. Bussan[1]

Lima bean (*Phaseolus lunatus*) is an important vegetable crop in Wisconsin. Acreage is limited relative to snap bean or pea, but several thousand acres are grown and processed within Wisconsin. Lima beans for processing are primarily grown in California, Wisconsin, and Delaware. Similar to snap bean, lima bean originates from Central and South America. Several lima bean types exist with small seeded, dwarf bush types being the primary processed type compared to the larger seeded, pole types. Lima beans are related to snap bean (*Phaseolus vulgarus*), but there are distinct differences in their growth that influences important management needs.

Field selection, field preparation, and planting are the first crucial steps toward successful lima bean production. Lima bean is susceptible to multiple soil born diseases and the large seed can be easily damaged or have difficulty emerging. As a result, poor stand establishment commonly causes the greatest yield limitations in lima bean. Sensitivity to soil borne diseases may be increased by the large seed, warm temperature requirement for emergence, and long season crop with slow emergence. Wet and compacted soils can inhibit germination and increase potential for poor stands so lima beans should be planted in well drained soils. Lima beans are typically planted in fields with medium to light loamy soils and high organic matter content. These soils facilitate good germination and crop emergence and have good soil moisture holding capacity. Lima beans are fairly drought tolerant relative to snap bean and tend to produce better under rain fed conditions on medium textured soils than under irrigation in Wisconsin.

Crop rotation is critical for successful long-term production of lima beans. Crop rotation is important for successful management of weeds as well as diseases. Lima bean is highly susceptible to white mold so fields should be selected with low white mold pressure. In addition, lima bean should only be planted once every 3 years and should never follow soybean in rotation. Other crops or weeds that can serve as alternative hosts for white mold or root rot disease complexes should also be avoided in the rotation. The rotation should be designed to manage weeds due to the limited herbicide tools available for use in lima bean. Avoid fields with chronic weed issues such as perennial weeds, nightshade, or field sandbur. If these weeds occur within lima bean, there are no herbicides available that will provide adequate control.

Most lima bean fields are clean tilled to provide a firm friable seed bed. Heavy soils should be chiseled or deep tilled the fall prior to planting lima beans to ensure good drainage and minimize the potential for wet soils in the spring. Do not till to much as aggregate stability of surface soil can be lessened and the field may become susceptible crusting with precipitation. Crusting can dramatically reduce emergence of lima bean. Lima beans should be planted after soil temperatures exceed 65 F (late May), but they

[1] Vegetable Production Specialist, Department of Horticulture, Univ. of Wisconsin-Madison, 1575 Linden Dr., Madison, WI, 53706

can be planted at a minimum soil temperature of 60 F. The minimum planting temperature for lima bean is higher than snap bean and other crops as lima beans prefer warmer temperatures. Optimal temperature for lima bean growth is 75 to 85 F.

Lima bean seed can be brittle so great care must be used during planting to prevent crushing or splitting of the seed. Damage to seed can increase the potential for infection by pathogens or inhibit the ability of the seed to germinate. Adjust planter and planting speed appropriately to minimize potential damage to seed. Prevent seed from drying to extensively to prevent cracking. Simultaneously, seed that has too much moisture may be vulnerable to damage as well. Seed should be placed in moist soil at 1 to 1 ½ inches below the soil surface. Never plant seed below 2 inches. Seed treatments can effectively protect seed from insects and pathogens and improve emergence. Seed lots should have a minimum germination rate of at least 80%. Lima bean should be planted at 100,000 plants in rows spaced from 12 to 36 inches apart. Narrower row spacings provide more competition against weeds, but are more vulnerable to white mold and cannot be cultivated. In contrast, wider row lima bean has better air movement through the canopy which prevents white molds and weeds can be cultivated, but the open canopy is more vulnerable to late season invasion by weeds.

Fertilizer and weed management recommendations are available in the commercial vegetable production guidelines (A3422). Lima beans require management of macronutrients nitrogen, phosphorous, and potassium as well as micronutrients zinc and manganese. Nitrogen management must be carefully managed as limiting N can reduce yield potential of the crop, but excessive N can result in rank vine growth and poor pod development and yield. Generally, lima beans need between 60 and 100 units of N depending on soil organic matter. Non-fertilizer forms of N (manure, previous legume crop in the rotation) should be credited when deciding upon N rates. Phosphorous and potassium application rates should be based on soil fertility tests and zinc and manganese rates should be based on soil and tissue tests.

Weed management in lima beans is difficult due to the few number of labeled herbicides and because lima beans are a short-statured crop that grows slowly. Perennial weeds should be managed prior to planting lima beans during production of rotational crops or fall prior to planting. Mechanical weed control practices such as stale seed bed techniques and inter-row cultivation can greatly improve weed management in lima bean. Rotary hoeing must be done with great caution as inappropriate timing can result in crop plant damage and loss in stand. Lima beans are sensitive to a number of herbicides used in rotation crops and rotational herbicide guidelines should be followed closely. Atrazine, Balance, Callisto, Harness/Surpass, as well as numerous others can carry over to lima bean. Standard herbicide program in lima bean include Pursuit Plus, Basagran, and Poast or Assure. Other products with potential use in lima bean include Command, Lasso, Dual, Prowl, Treflan, and Sandea. Be sure to read herbicide labels carefully as several products are labeled for use in fresh market lima bean, but cannot be applied to processing lima bean.