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# 2025 Southern Idaho Irrigated Spring Mustard Production

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## Contents

- 1 Introduction
- 1 Growth Stages and Management
- 2 Stand Establishment
- 2 Irrigation
- 2 Fertilization
- 4 Disease Management
- 4 Insect Pests
- 4 Weeds
- 4 Harvesting and Storage
- 4 Further Reading



## Introduction

- Mustard is a versatile crop used for condiments (70%), oils (20%), and spices (10%).
- Southern Idaho production:
  - » **Yellow mustard** 🔥 (*Sinapis alba*) 50% of planted acres; drought tolerant; mild tangy flavor ideal for condiments and mustard flour
  - » **Brown mustard** 🔥🔥 (*Brassica juncea*) 25% of planted acres; medium heat with a pungent and spicy flavor used in Dijon mustard and Indian, Chinese, and German cuisine
  - » **Oriental mustard** 🔥🔥🔥 (*Brassica juncea*) 25% of planted acres; high heat with a sharp, very pungent flavor used in Asian cuisine and spicy mustard blends
- Crop rotation benefits: biofumigation, weed suppression, pest reduction, improved soil structure, and nutrient cycling.

## Growth Stages and Management

Stage	Time Frame	Key Characteristics	Management Focus
Preplant			Weed control
Germination	0–1.5 weeks	Seedling emergence	Plant into good soil moisture with soil temperatures >40°F (ideal is 55°F–65°F)
Seedling	1.5–3 weeks	True leaf development	Flea beetle monitoring
Rosette	3–5 weeks	Dense leaf growth	Nutrient availability and soil moisture
Bolting	5–7 weeks	Stem elongation, branching	Nitrogen application, weed control, increased water consumption, fungicide application
Flowering	7–10 weeks	Pollination, pod initiation	Irrigation, nitrogen application, insect and disease monitoring, fungicide application
Pod Formation	10–12 weeks	Pod development	Timing irrigation termination when seeds are in medium to hard dough stage
Seed Maturation	12–14 weeks	Pods dry, seeds mature	Harvest is safe once 60% of the seeds in the pod begin to change color, minimizing the risk of green, unripe seeds
Harvest	14–16 weeks	Seed moisture 8%–10%	Harvest at 2 mph to prevent shattering

# Stand Establishment

## Rotation

- Ideal after cereals, before potatoes, or legumes; avoid canola for six years before/after mustard to prevent seed contamination through volunteers. Mustard is sometimes used as a cover crop.
- Be aware of the previous crop and herbicide plant-back restrictions.

## Soil Preparation

- Ideal pH: 6.0–7.5.
- Prefers well-drained loamy/sandy soils.

## Seeding

- **Rate:** 6–10 lb/ac (brown/oriental), 8–12 lb/ac (yellow).
- **Depth:** 0.25 inches.
- **Row Spacing:** 6–10 inches (narrow rows for canopy closure and weed suppression).
- Apply starter nitrogen fertilizer between the seed rows (NEVER with the seed) to avoid seedling damage.
- Apply light (~0.1”–0.2”), frequent applications of irrigation until seedlings emerge.

## Irrigation

- Yield reduction due to moisture stress is greatest at bolting and flowering.
- Excessive moisture can cause lodging and increase fungal infection risk. Preventive fungicides may reduce risk.
- Irrigate based on soil moisture depletion estimated by evapotranspiration (ET).
- ET: ~ 14–24 inches of water per season.



- Peak ET: mid-June to mid-July, decreasing after pod formation.
- Harvest will be delayed if additional irrigation/precipitation is supplied after flowering is complete due to new growth or delayed maturity.
- Monitor seeds exiting the soft dough stage, as cutting water too early can cause the seeds to shrivel.
- Center Pivot Systems
  - » Irrigation practices are similar to hard red spring wheat.
  - » Early season: Irrigate based on soil moisture reserves needed to meet mid- to late-season demands when the pivot cannot meet ET. Irrigate until the root zone is full or until water has penetrated 2.5–3 feet into the soil.
  - » Late season: Pivot will not supply sufficient water to keep up with ET; soil water reserves will be needed.
- Surface Systems
  - » First irrigation should occur when soil moisture declines to 50% at the 0–6-inch depth except on sandy soils.
  - » Maintain soil moisture levels at or above 50% from rosette through the end of flowering.

## Fertilization

### Sampling

- Soil testing is required to determine optimal nutrient management strategies.
- Timing: two weeks before planting.
- Depth: to rooting depth (2 feet on most soils).
- Separate samples:
  - » 0–12-inch and 12–24-inch depth for testing ammonium, nitrate, and sulfur.
  - » 0–12-inch depth for other nutrients.

### Nitrogen (N)

Current recommendations suggest that 6.8–8 lb residual soil N + fertilizer N be available per 100 lb of expected yield. Under irrigation, yellow mustard may yield 1600–2500 lb/ac, oriental and brown mustard may yield 1800–2800 lb/ac.

- Split applications may be done at planting (65%), rosette, and/or late-bolting to early flowering (35%) to improve yield and N use efficiency.
- Previous Crop Residue
  - » Potato/sugar beet/onion residues have a C:N ratio of 10:1–25:1. Crop residue N is accounted for by soil testing.
  - » Mustard and canola residues have a C:N ratio of 20:1–40:1. Crop residue N will likely be accounted for by soil testing.
  - » Grain residue has a C:N ratio of 50:1–100:1; add 15 lb N per ton of residue returned to the soil, up to 50 lb N/acre.
  - » Alfalfa provides 60–80 lb N/acre beyond soil test levels.
  - » Inorganic soil test N: Multiply ppm by 4 for lb N/acre.

### Phosphorus (P)

Phosphorus fertilizer rates for soils with pH>7.

NaHCO <sub>3</sub> (0–12 inches) (ppm)	Free Lime (%)			
	0	5	10	15
	(lb P <sub>2</sub> O <sub>5</sub> /acre)			
0	240	280	320	360
5	160	200	240	280
10	80	120	160	200
15	0	40	80	120
20	0	0	0	40

### Potassium (K)

- With soil test levels of 0–75 ppm K, apply 0–240 lb/acre K<sub>2</sub>O.

NaHCO <sub>3</sub> Extractable K (0–12 inches) (ppm)	Potassium Rates (lb K <sub>2</sub> O/acre)
0	240
25	160
50	80
75	0

### Sulfur (S)

- With soil test levels (0'–2') <10 ppm S and low-sulfur irrigation water, apply 20–40 lb/ac of sulfate-sulfur.
- Irrigation water from the Snake River or its aquifer can supply 30–70 lb sulfate-sulfur/acre foot of water.
- Elemental sulfur should be applied in the fall before planting to help break up the prill. Annually, approximately 33% of the elemental sulfur becomes plant available.
- Like nitrate, sulfate-sulfur can leach and should be applied near the time of planting.

### Micronutrients

Most southern Idaho soils have adequate levels of micronutrients. Use plant tissue sampling to diagnose suspected micronutrient deficiencies.



## Disease Management

Disease	Risk	Symptoms	Management
White Rust	High	White pustules, "staghead" deformity	Resistant varieties, drainage
Sclerotinia Stem Rot†	Moderate	White fungal growth on stems and leaves, plant parts above the affected areas turn yellow and wilt	Avoid rotations with lentils; apply fungicides at 10%–30% bloom
Clubroot	Low*	Swollen roots, stunting, wilting, and premature ripening	Four-year rotation; avoid infested fields
Alternaria Blight	High	Gray to dark leaf lesions, defoliation	Fungicides (e.g., Quadris), crop residue removal

\*\*Risk increases in wet conditions or short rotations.

†Sclerotinia is the most commonly observed disease in southern Idaho.

Mention of specific products does not connote endorsement by the University of Idaho. Always follow the label when using pesticides.

## Insect Pests

Pest	Threshold	Management
Flea Beetles	25% leaf damage	Seed treatments (e.g., Helix Vibrance, Mustang Maxx), pyrethroids (e.g., Grizzly)
Cabbage Seedpod Weevil	3–4/sweep at flowering	Foliar insecticides (e.g., lambda-cyhalothrin)
Diamondback Moth	100–150 larvae/m <sup>2</sup>	Spray at larval stage; preserve parasitic wasps
Cutworms	25–30% stand loss	Seed treatments (Fortenza), tillage preplant
False Chinch Bug	Flowering: 5–10 bugs/flowering raceme Early pod set: 10–20 bugs/raceme	Pyrethroids (e.g., Mustang Maxx)

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## Weeds

- **Common Weeds:** Hairy nightshade, kochia, wild oat, redroot pigweed, Canada thistle.
- **Management:**
  - » Treflan for broadleaves and clethodim for grasses and volunteer cereal control.
  - » Crop rotation and shallow tillage.

## Harvesting and Storage

- **Methods:**
  - » **Swathing:** At 75% seed color change (yellow/oriental) or 60% (brown). Anchor swaths to prevent wind loss.
  - » **Direct Combining:** Pods dry, seeds dark, and hard (8%–10% moisture). Adjust air flow to the lowest level possible, relying on shaking and threshing to harvest. Due to thick biomass, ground speed should be <2 mph. Match reel

speed to ground speed and raise the reel to prevent pod shatter. Set cylinder speed ≤800 rpm; adjust sieves (6–10 mm upper, 3–6 mm lower).

- **Storage:** Dry to ≤ 9% moisture; aerate to at least <60°F but colder temperatures will improve storage conditions. Monitor for heat, weevils, and psocids (indicative of fungal growth).

## Further Reading

- Saskatchewan Mustard Development Commission. 2024. *Mustard Production Manual*. Saskatoon, SK. <https://www.saskmustard.com/production-manual/>
- Rogers, C., B. Dari, and O. Walsh. 2020. *Soil-Testing Procedures for Southern Idaho Soils* (BUL 970). Moscow: University of Idaho Extension. n. p. <https://www.uidaho.edu/extension/publications/bul/bul970>
- Walsh, O., R. L. Mahler, and T. A. Tindall. 2023. *Soil Testing to Guide Fertilizer Management* (BUL 915). Moscow: University of Idaho Extension. 5 p. <https://www.uidaho.edu/extension/publications/bul/bul915>

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**Trade Names**—To simplify information, trade names may have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

**Groundwater**—To protect groundwater, when there is a choice of pesticides, the applicator should use the product least likely to leach.

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