Chinese Mustard Seed

Brassica campestris (Cruciferae)

Fast Facts:

Acres in Washington: 350
Per Acre Value: $1000-$1200
Value of Production in Washington: $350,000-$420,000
Number of Growers: less than 10

Description of crop:

Most, if not all, of the U.S. production of Chinese mustard seed is located in Washington. Chinese mustard seed is a direct-seeded annual that is planted in March or April and harvested in August or September. Approximately 80 % of the acreage is hybrid seed. The crop is hand-hoed to remove weeds and rogued to remove plants not displaying true varietal characteristics. At harvest, the crop is cut, windrowed and dried in the field for 10 to 14 days. After drying, the crop is threshed and the seed is sent to a conditioning plant, where it is cleaned to 99% purity. Companies control the location of seed crop fields to prevent cross pollination. Isolation distances of up to more than 2 miles can be necessary to prevent cross pollination. Chinese mustard seed crops are insect-pollinated, for which honey bees are used.

Key pests:

In eastern Washington, cabbage maggot is the most severe pest. Other insect pests include beet leafhopper, cabbage aphid, turnip aphid, loopers and cutworms. Weed pests include nightshades, pigweeds, lambsquarter, wild buckwheat, volunteer crops, foxtail and barnyard grass. White mold is the main disease of concern. Pest problems in western Washington are more extensive. Cabbage aphid, turnip aphid, seedpod weevil and cabbage maggot are severe pests. Other insect pests include cabbage looper, springtails, webworms, diamondback moth, cutworms, symphylans and wireworms. Weed pests include shepherdspurse, mustards, lambsquarter, pigweeds, smartweed, henbit, groundsel, chickweed, wild turnip, quackgrass, wild oat, Canada thistle, bolt thistle, vetch, nightshades and bedstraw. Shepherdspurse, groundsel and henbit are the more problematic weeds. Weeds are serious pests due to two issues. The seeds that the weeds produce are often very difficult to sort out of the seed crop. If the contaminating seeds are too costly or impossible to sort out, the seed crop is considerably lowered in value or rendered unmarketable. Weeds also serve as a host for insects and diseases. The most important diseases are powdery mildew, downy mildew, black rot (*Xanthomonas campestris* pv. *campestris* and *X. campestris* pv. *armoraciae*), black leg (*Phoma lingam*), Alternaria black spot and white mold (*Sclerotinia*

sclerotiorum). Bacterial soft rot of the heads and gray mold (*Botrytis cinerea*) can occur in spring following winter injury. Club root (*Plasmodiophora brassicae*) can be an occasional problem. Ring spot (*Mycosphaerella brassicicola*) occurs every winter/spring but is seldom of economic significance. Black rot and black leg are of quarantine significance and largely managed by strict screening of stock seed lots so that only non-infected stock seed is planted.

Key pesticides:

In eastern Washington, Di-Syston, Orthene, malathion and diazinon control aphids. Cabbage maggot is controlled with Lorsban before planting, and sugarbeet leafhopper is controlled with Asana. In western Washington, Lorsban and Pounce/Ambush are used for insect control, and endosulfan is applied mid-bloom to control seedpod weevil, cabbage maggot, cutworms and loopers. Trifluralin is used as a pre-plant incorporated to control broadleaf weeds. Curbit also controls broadleaf weeds. Fusilade is applied occasionally after harvest to control grasses. Hand-hoeing supplements weed control. Cultural practices such as extending the rotation period to 3 to 5 years helps reduce inoculum levels of pathogens in the soil, particularly to manage Alternaria black spot, white mold, club root, and other diseases in western Washington. Stock seed is treated with mefenoxam, thiram, and sometimes fludioxonil to control seedling blights. The loss of benomyl as a seed treatment in 2006 created significant concern about black leg becoming established in the seed production area again as benomyl seed treatment largely eradicated the problem from the cabbage seed industry. Thiabendazole has proved an effective alternative so an emergency seed treatment registration for stock seed lots was approved. Iprodione is applied to control Alternaria black spot and white mold. Boscalid and cyprodinil + flludioxonil are also used for white mold and gray mold (for the latter, in spring following any winter injury, for the former, starting at early petal fall). Mefenoxam, metalaxyl, and cymoxanil control downy mildew. Azoxystrobin and pyraclostrobin are used to control powdery mildews, Alternaria black spot and white mold. Mancozeb and chlorothalonil are used for general disease control. Due to over-wintering damage, copper hydroxide is usually applied in late winter or early spring to control bacterial soft rots. Copper hydroxide is applied to control bacterial soft rots and with mancozeb to help prevent black rot. Black-rot infected crops or seed lots are destroyed to prevent spread of the disease. The black rot bacterium can be spread by water, insects, equipment and animals. It persists in infected plant debris for up to two years and in the soil for months.

Critical pest control issues:

The lack of herbicides and reliance on hand–hoeing is a critical concern to growers. Efficacious herbicides are critical for seed production. Weed not only compete with the seed crop but act as host for insects and diseases. Weed seeds if they cannot be easily sorted out from the seed crop will

cause the value of the seed crop to drop or even cause the crop to be unmarketable. The loss of benomyl as a seed treatment in 2006 created significant concern about black leg becoming established in the seed production area again as benomyl seed treatment largely eradicated the problem from the cabbage seed industry. Finding more effective alternatives than copper hydroxide for control of black rot is a high priority need for cabbage seed production.

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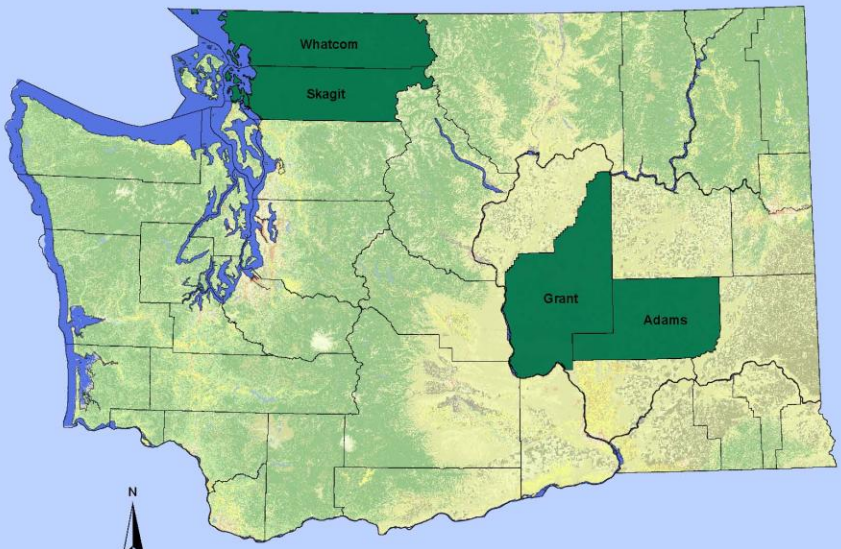
Location of production: Chinese mustard seed is produced in Skagit, Grant, Adams, and Whatcom Counties.

Chinese Mustard Seed Production in Washington State



0 25 50 100 Miles

Counties Producing Chinese Mustard Seed*

* Includes only those counties with significant crops acres. The crop may also be produced in counties not highlighted on the map.

WSDA
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DEPARTMENT OF AGRICULTURE

Deborah Bahs - April 2007