# Weed Management Priorities in Specialty Seed Production of the Pacific Northwest

Aaron Becerra-Alvarez[1]

Keywords. beet seed, brassicas, carrot seed, cole crops, herbicides, onion seed, spinach seed, vegetable seed

Abstract. **Vegetable specialty seed production is an important cropping system of the Pacific Northwest. Production requires low acreage for high value and a diverse list of seed crops. A survey was conducted on specialty seed crop practitioners, including producers, crop advisors, seed industry representatives, and researchers to understand the current weed management challenges. Respondents were from the Willamette Valley, Central Oregon, USA, and the Skagit Valley of Washington State, USA. *Brassica* crops, spinach, and radish seed were listed as the crops with the most weed management challenges; however, a diverse list of horticultural and vegetable crops for seed were listed, demonstrating the diversity of production in the region. Many common agricultural weeds were listed as challenging to manage. Most notably shepherd's purse and weedy Brassicaceae species were the weed species practitioners listed most frequently. Herbicides continue to be an important tool for weed management, and more than 90% of respondents prioritize herbicide research. Future research should improve efficacy and reduce crop injury from herbicide use while exploring new alternative herbicides. Herbicide resistance is also a concern that is directly and indirectly affecting specialty seed crops, due to either a lack of resources to monitor resistant weeds or crop rotations with agronomic crops. Practitioners are interested in nonchemical alternatives; however, there is a lack of research on the effect of cultural practices on weed management and on new weed control technologies in specialty seed crop production.**

The Pacific Northwest is an ideal location for seed production because of its Mediterranean-type climate with mild winters and dry summers, which allows for a reliable production of high-quality seed supply for the world market (Rackham 2002; Schudel 1952). More than 170 specialty seed crops are grown in the Pacific Northwest, including horticultural crops such as vegetables, cover crops, flowers, and herbs. The specialty seed industry is estimated to exceed 50 million USD of farm gate value (Oregon State University 2018). More than 19 seed companies in the region will contract with various growers to grow seed crops (Rackham 2002).

Received for publication 1 Jul 2025. Accepted for publication 24 Jul 2025.

Published online 29 Aug 2025.

[1]Department of Horticulture, Oregon State University, Corvallis, OR 97331, USA

A.B. is the corresponding author. E-mail: a.becerraalvarez@oregonstate.edu.



https://doi.org/10.21273/HORTTECH05724-25

Different regions of the Pacific Northwest have specific environments that allow for production of different vegetable specialty seed crops. The important seed production regions include the Willamette Valley in western Oregon, the Skagit Valley in northwest Washington, the Madras area in Central Oregon, and the Columbia Basin in Central Washington (Rackham 2002). The Willamette Valley is between the Pacific Ocean coast mountain range and the Cascade mountains on the east. The low precipitation and humidity during harvest time of the seed crops allow for excellent seed quality [Willamette Valley Specialty Seed Association (WVSSA) 2025]. The Skagit Valley in Washington has a cool maritime environment with mild winters and cool summers (Jones and Foss 2000). This is a similar climate to the Willamette Valley, and similar biennial and annual seed crops are produced in these two regions (Rackham 2002). The Central Oregon and Columbia Basin regions are semiarid environments with dry summers and colder dry winters. Central Oregon is dominated by carrot seed production, but parsley, onion, and garlic seed crops are also produced there (Jefferson County Seed Growers Association n.d.). The Columbia Basin produces similar seed crops to Central Oregon but also have acreages of radish, dill, coriander, and turnip (Columbia Basin Seed Association n.d.).

Vegetable crops do not compete well with weeds (Al-Khatib 1995). Therefore, weed management is a major challenge in specialty seed production systems (Watkins 1998). The specialty seed industry has historically relied on mechanical weeding, hand weeding, and herbicide tools for weed management in specialty seed production (Rackham 2002). As market opportunities and seed quality standards increased, combined with reduced labor availability and increased labor costs, the industry have relied more heavily on herbicides for weed control (Rackham 2002). Chemical companies will first register new herbicides in large acreage crops, and specialty crops are not a priority because the returns on investment are not met as they are in larger acreage crops, and the risk of liability is increased with high value crops (Fennimore and Doohan 2008). However, some herbicides get registered in the United States on specialty crops with assistance from the US Department of Agriculture—Interregional Project 4 (USDA-IR4) program for Section 3 registration or through Special Local Need labels for specific states that develop data and request new use (Fennimore and Doohan 2008). Specialty seed crops are typically small acreage but of high value, and chemical companies may register products where the liability of potential crop damage is absorbed by the producer either by signing a liability waiver or through agreements between the chemical company and grower groups on Special Local Need labels. Chemical company representatives that take the time to learn and understand the specialty seed industry have the most benefit to producers.

This article presents the results from a survey conducted on key industry representatives of the horticultural specialty seed crops in the Pacific Northwest regarding weed management. The aim is to understand and present the current weed management challenges in horticultural specialty seed crop production of the Pacific Northwest.

## Materials and methods

A 12-question survey was created to address the current weed management needs of vegetable specialty seed production in Oregon and Washington using Qualtrics software (Qualtrics XM, Seattle, WA, USA) (Supplemental Material 1). The survey link was sent by e-mail in Winter–Spring 2025 to producer groups and industry representatives, including the Specialty Seed Growers of Western Oregon e-mail list, prominent Central Oregon seed industry representatives, Puget Sound Seed Growers Association representatives, and Columbia Basin Seed Association representatives. It is estimated that ~125 people or more received the survey. Survey responses were collected rom 1 Feb 2025 to 27 May 2025. Responses were analyzed and presented as percentage proportions. The questions regarding crops and weeds asked the participants to list the top three crops where weeds are a challenge and what top three weeds are challenging. These data were analyzed first by count where similar listed crops and weeds were grouped together, and then percent proportions were presented (Asmus et al. 2013).

## Results and discussion

In total, 21 participants responded to the survey. The participants were mainly from the Willamette Valley in Oregon, five from the Skagit Valley in Washington, and two participants from Central Oregon. No responses from the Columbia Basin growing region were recorded. Thirty-three percent of participants identified themselves as specialty seed growers, 29% as crop advisors, 19% as seed industry representatives, and 19% were in agricultural research. More than 48% of participants selected had been involved in the specialty seed industry for 20 years or more; 24% had 10 to 20 years, 19% had 9 to 10 years, and 10% had 1 to 5 years in the specialty seed industry.

Survey participation had representation in the dominant seed-producing regions of the Pacific Northwest and experience with diverse seed crops. Many of the participants who identified as growers produce a diverse number of seed crops over the years. Specialty seed crops are only produced by contracts with the seed companies, and growers will not plant a seed crop without being certain the seed will sell (Rackham 2002). The crop advisors participating in the survey may also work with many growers and crops, which would provide information from a diverse scope of seed production challenges. The crop advisors are the main personnel who deal with pest management in the field and recommend actions to the growers. The perspective of weed management in the field is accurately presented in this survey through the experience of practitioners in the field. Nearly half of the participants had more than 20 years of experience in specialty seed crops, providing a wealth of knowledge and history of the industry.

The most common crops mentioned as weed management challenges were brassica crops such as cabbage, kale, mustard, turnip, kohlrabi, and possibly others (*Brassica oleracea* L., *B. rapa* L., and *B. napus* L., and *B. juncea*); spinach (*Spinacia oleracea* L.); and radish (*Raphanus sativus* L.) (Table 1). These are common crops grown in western Oregon and Washington and involve the most acreage (Al-Khatib 1995; Jones and Foss 2000; WVSSA 2025). Therefore, it would make sense there are more challenges because there is greater production of these crops. However, limited herbicide options for brassicas may also contribute to the challenge. Only four preemergence herbicides are available for seed crops, including s-metolachlor, simazine, clomazone, and trifluralin, whereas the remaining available herbicides are grass herbicides including quizalofop, fluazifop, and sethoxydim and one postemergence broadleaf option of clopyralid (Becerra-Alvarez 2025). The availability to use the herbicides may also depend on whether the state label of the growing region allows it, if the type of brassica species is tolerant, and if plants are direct-seeded or transplanted, thus limiting options further (Becerra-Alvarez 2025). Beets (*Beta vulgaris* L.) and cucurbit crops such as squash, cucumber, and pumpkin (Cucurbitaceae) were the second most commonly listed crops with weed management challenges (Table 1). A diverse list of 10 other seed crops comprising 6% were mentioned, demonstrating the complexity of seed production and the need to understand production of various crop species (Table 1).

When asked what weed species were the most challenging, responses included 26 weeds. However, the most frequently mentioned species included shepherd's purse (*Capsella bursa-pastoris* L.) and wild mustard (*Sinapis arvensis* L.) (Table 2). Given that Brassicaceae seed crops are major crops, it make sense that practitioners have challenges

**Table 1. The specialty seed crops with the greatest weed management challenges in the Pacific Northwest listed by practitioners on a survey assessed in 2025[i].**

| Crop | Scientific name | Proportion of total listings (%) |
|---|---|---|
| Brassicas[ii] | Various *Brassica oleracea* L., *B. rapa* L., *B. napus* L., and *B. juncea* | 15 |
| Spinach | *Spinacia oleracea* L. | 15 |
| Radish[iii] | *Raphanus sativus* L. | 15 |
| Beets | *Beta vulgaris* L. | 9 |
| Cucurbits | Various Cucurbitaceae species | 9 |
| Bunching onions | *Allium fistulosum* L. | 6 |
| Flower seed[iv] | Various species | 6 |
| Carrot | *Daucus carota* L. | 6 |
| Cover crop seed[v] | Various species | 4 |
| Onion | *Allium cepa* L. | 4 |
| Clover | *Trifolium* spp. | 4 |
| Meadowfoam | *Limnanthes alba* Benth. | 2 |
| Lettuce | *Lactuca sativa* L. | 2 |
| Parsley | *Petroselinum crispum* L. | 2 |
| Peas | *Pisum sativum* L. | 2 |

[i] Participants were asked, "What are the top three specialty seed crops where you face most challenges with weed management?" The proportion presented is based on 53 total listings.
[ii] Brassicas may include kale, cabbage, turnip, mustards, kohlrabi, and others that are fall or spring seeded or transplanted.
[iii] Includes red and hybrid radish species grown for seed.
[iv] Various native and nonnative flower species grown for seed.
[v] May include crops such as hairy vetch, phacelia, and others.

**Table 2. The 10 most listed weed species with greatest management efforts to Pacific Northwest specialty seed crop practitioners listed on a survey assessed in 2025[i].**

| Common name | Scientific name | Proportion of total listings (%) |
|---|---|---|
| Shepherd's purse[ii] | *Capsella bursa-pastoris* L. | 15 |
| Wild mustard[ii] | *Sinapis arvensis* L. | |
| Nightshades | *Solanum* spp. | 13 |
| Pigweeds | *Amaranthus* spp. | 10 |
| Common field bindweed | *Convolvulus arvensis* L. | 8 |
| Catchweed bedstraw | *Galium aparine* L. | 7 |
| Common groundsel | *Senecio vulgaris* L. | 5 |
| Common lambsquarters | *Chenopodium album* L. | 5 |
| Russian thistle | *Salsola tragus* L. | 3 |
| Smartweed | *Persicaria* spp. | 3 |
| Yellow nutsedge | *Cyperus esculentus* L. | 3 |

[i] Participants where asked, "What weed species are you struggling most with to control in the specialty seed crops listed above? List top three weed species." The proportion presented is based on 60 total listings.
[ii] Weedy Brassicaceae species were grouped together as one count.

with weedy Brassicaceae species because many herbicides may not control them (Al-Khatib et al. 1995). Shepherd's purse was observed to be the dominant weed species in many specialty seed fields in the 2025 season in Willamette Valley, which could indicate current management is hospitable to shepherd's purse, allowing it to dominate (personal observation). Al-Khatib et al. (1995) also reported shepherd's purse as a dominant weed in cabbage seed production in western Washington. Previous research on shepherd's purse competition with radish and cabbage suggest that radish could outcompete it, but cabbage showed greater reductions in yield (Freyman et al. 1992; Perera and Ayres 1992). However, these studies were on food crops and not for seed production. Seed production has stricter weed thresholds to ensure high seed quality; however, there are not many studies on the effects of weed competition on vegetable seed production crops (Watkins 1998). Additionally, the weedy Brassicaceae species can harbor diseases like black rot and club root that can spread and reduce seed yields or eliminate the crop (Greer et al. 2023).

The nightshades (*Solanum* spp.) and pigweed (*Amaranthus* spp.) were mentioned by more than 10% of the total responses (Table 2). These weeds are common broadleaf weeds in many agricultural fields and common in the Pacific Northwest (Peachey et al. 2004). It is not surprising that practitioners frequently mentioned these species. The following 7% and 8% of responses mentioned weed species with low creeping growing habits, including common field bindweed (*Convolvulus arvensis* L.) and catchweed bedstraw (*Galium aparine* L.) (Table 2). These weed species are not easily controlled with many herbicides, and soil cultivation may not be effective or could even spread them, allowing them to persist in agricultural fields (Davis et al. 2018; Defelice 2002). Common groundsel (*Senecio vulgaris* L.) and common lambsquarters (*Chenopodium album* L.) were both mentioned by 5% of respondents as common troublesome broadleaf weeds in agricultural fields and they are significant competitors to vegetable crops (Grundy et al. 2004). Finally, 3% of responses were perennial weeds, including Russian thistle (*Salsola tragus* L.), smartweed (*Persicaria* spp.), and yellow nutsedge (*Cyperus esculentus* L.) (Table 2). The minimal requirements for survival and persistent nature of perennial weeds allow them to continue challenging management efforts for various years in one field.

The participants were asked three questions specific to their weed management efforts. The biggest challenge to weed management participants mentioned was the limited available herbicide options (Table 3). More than half of participants indicated weeds to be of most concern during the spring growth and at harvest than at crop establishment (Table 3). Herbicides were the most used tool for weed management, followed by cultivation and hand weeding (Table 3). This may indicate that herbicides available at crop establishment may be effective; however, the soil residual does not persist long enough to provide season-long control. More than 70% of participants indicated new preemergence herbicides or herbicides with soil residual activity would benefit production systems (Table 3). The agronomic practice of starting with a clean, weed-free field and staying clean by overlaying soil residual herbicides has been successful in agronomic crops for herbicide-resistance management (Osterholt et al. 2019). Vegetable specialty seed crop production systems could benefit from similar practices with the addition of new herbicides. The lack of available herbicide options makes weed management challenging, and new options could improve weed control (Becerra-Alvarez 2025).

Interestingly, 71% of respondents selected herbicide crop injury as a challenge in their production systems (Table 3). It is unclear whether the concern is from registered products on the seed crops or from herbicide carryover from previous crops. However, given the diversity of crops, conducting herbicide research that understands herbicide injury on various crops and cultivars will be important to provide practitioners with the knowledge to use products effectively and prevent injury in the field. Horticultural specialty seed crops are rotated on fields with agronomic crops such as grass seed, field corn, and wheat from year to year (Boyd et al. 2022; Rackham 2002). Understanding the herbicide residual carryover in different environments will also be useful information for practitioners, especially as new herbicide compounds for agronomic crops become available.

Although herbicides are a critical tool in specialty seed production to achieve high-quality products, practitioners are interested in nonchemical or certified organic options that are effective (Table 3). Hand weeding is an available option; however, the recent increase in labor costs and personnel shortages make it more challenging than ever to use this tool (Fennimore and Cutulle 2019). New technology such as smart cultivators, smart sprayers, laser weeders, or electric weeders may hold potential in the specialty seed crops. However, given the diversity of crops in the Pacific Northwest, the technology must be useful for many crops

**Table 3. Responses from Pacific Northwest specialty seed crop practitioners regarding weed management on a survey assessed in 2025[i].**

| *Q: At what stage are weeds most of a concern?* | |
|---|---|
| | % selected |
| Active growth in spring | 76 |
| At harvest | 76 |
| At crop establishment | 33 |
| Active growth in fall | 14 |
| *Q: What methods/tools do you use for weed management in your specialty seed crops?* | |
| | % selected |
| Herbicides | 95 |
| Mechanical cultivation | 81 |
| Hand weeding labor | 76 |
| Crop rotations | 62 |
| Cover cropping | 14 |
| Other[ii] | 5 |
| *Q: What are the biggest challenges you face managing weeds on your specialty seed crop operations?* | |
| | % selected |
| Limited herbicide options | 95 |
| Herbicide crop injury | 71 |
| Weed management costs | 38 |
| Lack of available nonchemical tools | 29 |
| Labor shortages | 24 |
| Herbicide application timings | 19 |
| Herbicide resistance | 14 |
| Other[iii] | 14 |
| *Q: What herbicide application methods would be most valuable to your operations for the introduction of new herbicide options?* | |
| | % selected |
| Preemergence herbicides | 75 |
| Postemergence herbicides with soil residual activity | 70 |
| Postemergence herbicides with no soil residual activity | 50 |
| After direct seeding, before crop emergence | 45 |
| After transplanting | 40 |
| Herbicides for layby applications | 25 |
| Before transplanting | 15 |

[i] There were 21 survey participants. Respondents could select up to three options for each question.
[ii] One response only: "Row crop sprayer with photo eye guidance."
[iii] The lack of certified organic options were listed in "other."

to be cost-effective. The evaluation of these technologies by University Extensions in specialty seed crops would be useful for producers to learn whether such technologies would be good investments. Crop rotation and cover cropping are common practices that may offer weed management benefits (Table 3). However, there is a lack of research on their effect on weed management in the region's diverse cropping systems.

Herbicide resistance has been an increasing concern in the Pacific Northwest (Pacific Northwest Herbicide Resistance Initiative 2024), particularly in agronomic crops; however, horticultural crops have also been directly or indirectly affected (Boyd et al. 2022). In this survey, 14% of participants selected herbicide resistance as a concern in their management efforts (Table 3). Of the weed species listed in Table 2, common groundsel, common lambsquarters, pigweeds, and Russian thistle have recorded or suspected herbicide resistance in the Pacific Northwest in agronomic crops (Becerra-Alvarez and Ribeiro 2025). Suspected resistance of common groundsel in Central Oregon has been ongoing, but the lack of resources to monitor has prevented confirmation of any suspicions (Spring J, personal communication, Central Oregon Seed Inc.). Additionally, in the Willamette Valley, herbicide resistance in Italian ryegrass (*Lolium perenne* ssp. *multiflorum*) has been increasing in the grass seed industry and affecting the vegetable seed crops when the fields are rotated (Boyd et al. 2022). Currently, producers will use hand-weeding labor to remove the ryegrass-resistant biotypes to ensure seed quality when they can afford it and if it is available.

## Conclusions

The producers and crop advisors who work in specialty seed crop production must manage diverse crop portfolios and rotations to implement adequate weed management appropriately. Weedy Brassicaceae species including shepherd's purse are the greatest concern for practitioners. The weed species listed by the participants will help direct future research in the specialty seed production systems. Herbicides are the major tool to achieve adequate yields and high seed quality. Continuing herbicide research will be important to improve current practices and investigate new potential herbicides to introduce to different specialty seed crops. New weed control technologies may provide effective nonchemical alternatives in specialty seed production; however, regional research on efficacy and cost-effectiveness is needed. There is a need to improve knowledge in crop rotation and cover crop management for weed control in specialty seed crops. The monitoring of herbicide-resistant weed populations in specialty seed crop production would help improve holistic crop management efforts.

## References cited


Al-Khatib K. 1995. Weed control in cabbage, table beet, and spinach grown for seed. Washington State University Extension Bulletin 1798. https://rex.libraries.wsu.edu/view/pdfCoverPage?instCode=01ALLIANCE_WSU&filePid=13332956140001842&download=true accessed 1 Aug 2025.

Al-Khatib K, Libbey C, Kadir S. 1995. Broadleaf weed control and cabbage seed yield following herbicide application. HortScience. 30(6):1211–1214. https://doi.org/10.21273/HORTSCI.30.6.1211.

Asmus A, Clay SA, Ren C. 2013. Summary of certified crop advisors' response to a weed resistance survey. Agron J. 105(4):1160–1166. https://doi.org/10.2134/agronj2013.0152.

Becerra-Alvarez A. 2025. Pacific Northwest weed management handbook. Oregon State Extension Communications. https://pnwhandbooks.org/weed. [accessed 10 Jun 2025].

Becerra-Alvarez A, Ribeiro V. 2025. Managing herbicide-resistant weeds. In: Pacific Northwest weed management handbook. Oregon State Extension Communications. https://pnwhandbooks.org/weed/agrichemicals/managing-herbicide-resistant-weeds. [accessed 30 Jun 2025].

Boyd NS, Moretti ML, Sosnoskie LM, Singh V, Kanissery R, Sharpe S, Besançon T, Culpepper S, Nurse R, Hatterman-Valenti H, Mosqueda E, Robinson D, Cutulle M, Sandhu R. 2022. Occurrence and management of herbicide resistance in annual vegetable production systems in North America. Weed Sci. 70(5):515–528. https://doi.org/10.1017/wsc.2022.43.

Columbia Basin Seed Association. n.d. Columbia Basin Seed Association & Columbia Basin Seed Field Representatives Association, Grant County, Washington State University. https://extension.wsu.edu/grant/agriculture/potato-vegetable-production-systems/cbvsa-cbvsfra/. [accessed 30 Jun 2025].

Davis S, Mangold J, Menalled F, Orloff N, Miller Z, Lehnhoff E. 2018. A meta-analysis of field bindweed (*Convolvulus arvensis*) management in annual and perennial systems. Weed Sci. 66(4):540–547. https://doi.org/10.1017/wsc.2018.25.

Defelice MS. 2002. Catchweed bedstraw or cleavers, *Galium aparine* L.—A very "sticky" subject. Weed Technol. 16(2):467–472. https://doi.org/10.1614/0890-037X(2002)0160467:CBOCGA.

Fennimore SA, Cutulle M. 2019. Robotic weeders can improve weed control options for specialty crops. Pest Manage Sci. 75(7):1767–1774. https://doi.org/10.1002/ps.5337.

Fennimore SA, Doohan DJ. 2008. The challenges of specialty crop weed control, future directions. Weed Technol. 22(2):364–372. https://doi.org/10.1614/WT-07-102.1.

Freyman S, Brookes VR, Hall JW. 1992. Effect of planting pattern on intra-row competition between cabbage and shepherd's purse (*Capsella bursa-pastoris*). Can J Plant Sci. 72(4):1393–1396. https://doi.org/10.4141/cjps92-172.

Greer SF, Surendran A, Grant M, Lillywhite R. 2023. The current status, challenges, and future perspectives for managing diseases of brassicas. Front Microbiol. 14:1209258. https://doi.org/10.3389/fmicb.2023.1209258.

Grundy AC, Mead A, Burston S, Overs T. 2004. Seed production of *Chenopodium album* in competition with field vegetables. Weed Res. 44(4):271–281. https://doi.org/10.1111/j.1365-3180.2004.00399.x.

Jefferson County Seed Growers Association. n.d. http://jeffcoseed.com/jefferson-county/. [accessed 30 Jun 2025].

Jones LJ, Foss CR. 2000. Crop profile for cabbage seed in Washington. Washington State University Extension. https://rex.libraries.wsu.edu/esploro/outputs/report/Crop-Profile-for-Cabbage-Seed-in/99900501953801842. [accessed 27 Jun 2025].

Oregon State University. 2018. Specialty seed production resources from Oregon State University. https://horticulture.oregonstate.edu/oregon-vegetables/cropping-systems/specialty-seed-production-resources-oregon-state-university. [accessed 20 Jun 2025].

Osterholt MJ, Webster EP, Blouin DC, McKnight BM. 2019. Overlay of residual herbicides in rice for improved weed management. Weed Technol. 33(3):426–430. https://doi.org/10.1017/wet.2019.22.

Peachey RE, William RD, Mallory-Smith C. 2004. Effect of no-till or conventional planting and cover crops residues on weed emergence in vegetable row crop. Weed Technol. 18(4):1023–1030. https://doi.org/10.1614/WT-03-205R.

Perera KK, Ayres PG. 1992. Effects of shepherd's purse (*Capsella bursa-pastoris* L. Medic.) on the growth of radish (*Raphanus sativus* L.). Weed Res. 32(5):329–335. https://doi.org/10.1111/j.1365-3180.1992.tb01893.x.

Pacific Northwest Herbicide Resistance Initiative. 2024. Home page. https://pnwhri.org. [accessed 30 Jun 2025].

Rackham RL. 2002. History of specialty seed crop production in the Pacific Northwest. Willamette Valley Specialty Seed Crops Association, Willsonville, OR, USA.

Schudel HL. 1952. Vegetable seed production in Oregon (Station Bulletin 512). Oregon State College Agricultural Experiment Station, Corvallis, OR, USA.

Watkins JT. 1998. Seed quality problems commonly encountered during vegetable and flower seed production. Seed Technol. 20(2):125–130. https://www.jstor.org/stable/23433017.

Willamette Valley Specialty Seed Association. 2025. About us. https://www.thewvssa.org/index.htm. [accessed 30 Jun 2025].