

Late fall seeding of coriander

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Coriander (*Coriandrum sativum* L.), an annual herb of the carrot family (Apiaceae syn. Umbelliferae), is the most widely grown spice crop in Saskatchewan. In 1998, nearly 30,000 acres (12,000 hectares) of coriander were grown for seed in Saskatchewan with an estimated production of 10,900 tonnes for an average yield of 800 lb/acre (900 kg/hectare). In addition, a small acreage of immature coriander (cilantro) was harvested and distilled for its essential oil (cilantro oil). The seeds are used in cooking and for flavouring meats, candies, beverages and tobacco products. The essential oil is used in perfumes and soaps.

Coriander and many members of the Apiaceae are characterized by having an immature embryo in the freshly harvested seed. The seeds must imbibe water and undergo physiological maturation before they can germinate. This is why it usually takes about three weeks for seeds of these species to germinate and for the seedlings to emerge. This also means that these seeds can be seeded extra early in the spring with minimal risk of frost damage to the seedlings, which are hardy and will tolerate light frosts.

Coriander plants have an indeterminate flowering habit and will form three sets of flowers and seed heads (umbels); primary, secondary and tertiary, provided growing conditions are favourable. Each set of umbels is progressively later and smaller than the previous one. Thus, in cool, wet seasons the plants mature late and, in short-season areas like Saskatchewan, they will often be damaged by an early fall frost. The risk of yield and quality losses by an early fall frost can be reduced by breeding an earlier cultivar, breeding a determinate cultivar or by seeding earlier in the spring. Another approach is to seed coriander late in the fall, just before freeze-up, so that the seed does not germinate before the next spring. The immature embryo of coriander acts as a type of dormancy mechanism to delay germination and emergence in the spring. This reduces the risk of frost damage to the seedlings and results in an earlier maturing crop, which reduces the risk of damage from early fall frosts.

Thus, the objectives of this study were to 1) evaluate the potential of late fall seeding (dormant seeding) of coriander as a means of reducing the risk of early fall frost to the coriander crop, and 2) determine the effect of dormant seeding on seed yield, plant height and maturity of coriander.

Materials and methods

A randomized complete block design with four species of Apiaceae (coriander, dill, anise and annual caraway) was used at three locations: Saskatoon, Outlook (irrigated) and Indian Head. The Indian Head data were incomplete and are not reported here. Only the results of the coriander trial will be reported here. Two seeding rates were used: normal (10 fruits/ft² or about 120 fruits/m²) and four x normal. Since each coriander fruit consists of two hemisphere-shaped seeds, the normal seeding rate was 20 seeds/ft². Four replications were used at each site and seeding was done during the last week of October 1997. Each plot consisted of four rows 3.5 m long and 0.3 m apart.

Data were collected on date of first flower, plant height and seed yield.

Results and discussion

The dormant-seeded coriander emerged in late April and was not damaged by the May frosts. A severe frost (-6) on June 1 damaged a few leaves, but no lasting effect occurred. The coriander plants started bolting in early June. They started flowering about June 15, almost one month before the spring-seeded coriander in an adjacent plot started flowering. The dormant-seeded coriander was ready to harvest about two weeks earlier than the spring-seeded coriander, thus, greatly reducing the risk of damage from an early fall frost. The rainfall pattern in 1998 was abnormal since no rain was received between planting and about June 20. As a result, the dormant-seeded coriander plants were much shorter than the spring-seeded coriander plants. This may not be true in years in which the dormant-seeded coriander plants do not undergo severe drought stress before and during bolting.

Even with the reduced plant height, the seed yield of the dormant-seeded coriander was on par with that of the spring-seeded coriander at both Saskatoon and Outlook (irrigated). The 4x-seeding rate had no effect on date of first flower, plant height or seed yield of dormant-seeded coriander at either location.

Dormant-seeded dill responded in the same manner as the dormant-seeded coriander dill at both locations. However, the dormant-seeded anise and annual caraway had poor stands, even at the 4x-seeding rate. Perhaps, the seed of anise and annual caraway had poor germination from a pre-harvest frost. In any event, this experiment will be repeated at two locations again in 1998-99 with the addition of ajowan and a plastic-coated seed treatment designed to delay germination even more.

Summary

Dormant seeding (just before freeze-up) of coriander resulted in plants that flowered one month earlier and matured about two weeks earlier than spring-seeded coriander. The dormant-seeded coriander plants were shorter than the spring-seeded plants, but the seed yield was about the same. First year results suggest that dormant seeding of coriander (and dill) may greatly reduce the hazard of early fall frosts to late maturing coriander. These experiments will be repeated at two locations in 1998-99 in an effort to confirm this conclusion.