

THRIPS INFESTING THE TIPS OF ASPARAGUS SPEARS¹

F. L. BANHAM¹

ABSTRACT

The onion thrips, *Thrips tabaci* Lind., and the flower thrips, *Frankliniella tritici* (Fitch), mainly from *varicornis* Bagnall, were found in the tips of asparagus spears from commercial fields in the southern interior of British Columbia. Both species occurred in about equal numbers except in one area, where *F. tritici* form *varicornis* was the more abundant species. Only adults were found. These migrant thrips do not damage the spears but are a potential source of contamination in the processed product. Thrips were most abundant in spears with loose or "blown" tips. In all areas, the highest infestations of thrips in the spears occurred in fields with a heavy weed cover. The weed cover and bordering forage crops, including alfalfa, provided a constant source of infestation. Increased numbers of thrips in spears coincided with increased daily temperatures and cutting of bordering forage crops. Effective weed control reduced the numbers of thrips infesting the spears.

Introduction

The presence of thrips in the tips of harvested asparagus spears has caused concern among growers and processors in the southern interior of British Columbia since 1961. When thrips are abundant in the tips of asparagus spears, processors are forced to use special washing processes prior to canning or freezing to remove this potential source of contamination from the processed product. In some instances, processors have threatened to cancel the contracts of growers whose asparagus was heavily infested with thrips. Field and laboratory investigations were conducted to determine the extent of feeding damage, the species, the stage of insect development, the probable sources of infestation, and an economic control against thrips infesting growing asparagus spears.

Materials and Methods

In 1963 and 1964, the occurrence of thrips in asparagus fields was determined in four widely separated areas from Kamloops to Kelowna. In one area, which was heavily infested, five fields were inspected at weekly intervals throughout the harvesting seasons. In three other areas, inspections were made in fewer fields and less frequently. Field inspections were made by dislodging thrips from four

or more samples each of twenty-five growing or freshly harvested spears. Thrips were dislodged from the spears by tapping individual spears into the palm of the hand. Spears were tapped over a sheet of white paper when excessive amounts of soil particles or other debris made sorting of the thrips difficult.

In 1964, weekly laboratory examinations were made to determine the numbers of thrips, stage of development, and the extent of feeding damage on the spears and bracts. Four samples, each of ten randomly selected asparagus spears, were harvested from fields infested with thrips. One sample was stored in a potassium cyanide killing bottle and the other three sealed in plastic bags. Asparagus spears from the killing bottles were dissected with the aid of a binocular microscope to determine the numbers of thrips, their stage of development, the location, and extent of feeding damage. Bracts were removed from spears stored in the plastic bags. Immediately, each was placed in a 10% sodium chloride brine solution and agitated. Flotation debris was inspected under the microscope to determine the presence of thrips or parts of thrips.

To ascertain the effect of weed control on infestations of thrips in the asparagus spears, weekly counts were continued in 1964 in two fields which, in 1963, had a dense weed growth and

¹ Contribution No. 237. Research Station, Canada Agriculture Summerland, British Columbia.

were heavily infested with thrips. In one field, a pre-emergence application of Monuron herbicide was made in April, 1964. In the second, a heavy weed cover was suppressed by disc-cultivation in the first week of June. The abundance of thrips on the foliage of weed plants in the asparagus fields and on adjacent crop plants was determined at the same intervals by sweeping with a 13-inch diameter canvas sweep net.

Results

Two species of thrips were identified by Dr. W. R. Richards, Systematics Unit, Entomology Research Institute, Canada Agriculture, Ottawa, in samples collected from asparagus spears, weed plants and adjacent forage and crop plants. Only adults were found in the tips of the asparagus spears. The onion thrips, *Thrips tabaci* Lind., and the flower thrips, *Frankliniella tritici* (Fitch), mainly form *varicornis* Bagnall, were present in about equal numbers both midway through and at the end of the harvesting season in all but one area where the latter was the more abundant species throughout the season. In all areas, fields with a heavy weed cover including: Canada thistle, *Cirsium arvense* (L.) Scop.; common dandelion, *Taraxacum officinale* Weber; shepherd's purse, *Capsella bursa-pastoris* (L.) Medic.; lamb's quarters, *Chenopodium album* L.; couch grass *Agropyron repens* (L.) Beauv.; and storksbill, *Erodium cicutarium* L.; were infested with several forms of *F. tritici*. Some *T. tabaci* were also present. *F. tritici* form *varicornis* was taken on wheat and was also more abundant than *T. tabaci* on alfalfa. Nymphs and adult thrips were collected from most of these plant species.

Laboratory examinations showed that thrips were present only on the bracts of the tips of the asparagus spears. Most thrips were found in spears with loose bracts. These spears are described as having open or "blown" tips. Thrips observed feeding or harbouring on the bracts caused no

detectable damage.

The highest infestations of thrips occurred in the Armstrong area in asparagus fields with heavy weed cover. In 1963, counts averaged 13.3 thrips per spear (range 0-19) in one weedy field compared to 0.5 thrips per spear (range 0-3) in a clean cultivated field. In the other areas, counts during the same period varied from 0.02 to 1.4 thrips per spear (range 0 to 3). Armstrong was the only area where populations of thrips in the weed cover of asparagus fields were higher than those in the bordering weed or crop cover.

At Armstrong, when infestations of thrips in the asparagus spears were high, mature alfalfa bordering the fields had populations averaging 10.9 thrips per sweep and fall wheat 1.9 thrips per sweep. Lamb's quarters in or bordering the field averaged 8.5 thrips per sweep and shepherd's purse 2.1 per sweep. Moderate to heavy foliage covers of Canada thistle, common dandelion and storksbill had lighter populations. Couch grass had the lowest populations.

In 1963 and 1964, populations of thrips in the asparagus fields and adjacent vegetation increased as the season progressed. Populations of thrips increased significantly in the third and fourth weeks of May and continued to increase till the third week of June when harvesting ended. In all areas, the initial increase in populations of thrips coincided with the cutting and drying of forage crops in nearby fields. This is illustrated by brine flotation counts which rose to 7.0 thrips per spear two days after and peaked at 10.3 thrips per spear nine days after the adjacent field of alfalfa was cut. The pre-cut count averaged only 0.75 thrips per spear.

Suppressing or eradicating the weed cover within an asparagus field reduced the numbers of thrips in the spears. At Armstrong, in 1964 a pre-emergence application of Monuron herbicide effectively suppressed the growth of weeds in one field which had a heavy weed growth in 1963. In

the second week of June, the average number of thrips in the asparagus spears was 0.3 per spear in 1964 compared with 4.1 per spear in 1963. The 1964 count was lower than the 0.5 thrips per spear average for clean cultivated fields in the Armstrong area and was similar to that of clean cultivated fields in other areas. During the harvesting season, disc-cultivation to suppress a heavy cover of weeds also reduced infestations of thrips in the spears from 10.3 per spear to 3.8 per spear in one week and to 1.5 per spear in two weeks.

Discussion

Processors can tolerate the occasional presence of small numbers of thrips in the tips of a few asparagus spears. These can be removed from the bracts by washing prior to processing. Although *F. tritici* and *T. tabaci* cause no apparent damage to the asparagus, heavy infestations of 13 thrips per spear create a risk that the processed product will be contaminated.

In California, Michelbacher and Bacon (1949), reported that mainly adult thrips of the *Frankliniella* complex infested asparagus spears for periods of about one week in some years. Fields with heavy weed cover had the highest infestations. In British Columbia, only adult thrips were found, indicating that these were migrants. *F. tritici*, mainly form *varicornis*, and *T. tabaci* infested asparagus spears for about five weeks. The maximum number of thrips per spear was about double that reported from California.

Laboratory inspections made in 1962, at the processing plant of Cana-

dian Cannery Ltd., Vancouver, showed that the highest incidence of thrips occurred in asparagus spears from the Armstrong area. Field and laboratory investigations in 1963 and 1964 confirmed this. Field inspections showed that weed growth was heavier in the non-irrigated Armstrong area than it was in the irrigated areas. Growers in the Armstrong area claim a heavy weed cover shades the asparagus and slows "tip-blowing." Field observations showed this cultural practice increased the amount of "tip-blowing" by causing over-maturity; mature spears frequently were shielded from view during harvesting operations. "Blown" tips permitted *F. tritici* and *T. tabaci* to enter and feed or harbour on the bracts. In fields with a heavy weed cover, the chance of migrant thrips entering the bracts would be reduced by harvesting the spears at a less mature stage when the tips are tight.

Weed control in and bordering an asparagus field reduces infestations of thrips in the spears. The use of herbicides and cultivation to control the weeds lowered infestations of thrips to tolerable levels. Further reductions might be achieved by staggering the time of cutting forage in each bordering field. Trap strips of alfalfa or other forage left on the side of a field bordering the asparagus should assist further to reduce the number of thrips.

Acknowledgments

The author acknowledges with thanks the co-operation of Messrs. H. J. Hewitt, Fieldman, Canadian Cannery Ltd., Kelowna, B.C., and E. M. King, Vegetable Specialist, British Columbia Department of Agriculture, Kelowna, B.C.

References

- Michelbacher, A. E. and O. G. Bacon. 1949. Thrips on asparagus. *J. Econ. Entomol.* **42**:849-50.