same population) naturally infected with *Nosema fumiferanae* (Thom.) were reared on three diets: a synthetic diet and fresh buds of either balsam fir or white spruce (*Picea glauca* [Moench] Voss). The diets were placed in 28.35 g (1 oz) plastic cups, sealed with parafilm under the lid. Six cups were used with each diet, approximately six larvae being placed in each cup. Insects were reared at room temperature (21-23°C) and RH 40-60%. The cups were examined every 3 days, and wilted or deteriorated buds were replaced with fresh buds, and dead larvae discarded.

Larvae were removed from the diets just before pupation (18-22 days), frozen, and air-dried, and the microsporidian spores were counted by the procedure described by Wilson (Can. Entomol. 108:383-386, 1976). Table 1 shows that similar spore counts were obtained from the larvae on all test diets, which suggests that the ingredients of the synthetic diet had no effect on the ability of the microsporidia to multiply.—G.G. Wilson, Forest Pest Management Institute, Sault Ste. Marie, Ont.

Chemical Control of a Seed-boring Sawfly and a Midge Damaging Chokecherry in Alberta.—The common chokecherry, *Prunus virginiana* L., grows abundantly throughout the Prairie Provinces along field edges, wetlands, and wooded areas. The astringent black berries are used extensively as food by mammals and birds and to a lesser degree by man. The fruit was added to pemmican and was of considerable importance to pioneers for making jams, jellies, and wine. Recently there has been renewed interest in the market potential of these products.

The life history of the midge has not been published. Preliminary observations indicate that adults emerge in May and that the female lays its eggs somewhere in the flowers shortly after mating. The egg hatches in a few days, and the yellowish orange maggot enters the developing fruit. Several maggots feed within the same fruit, causing it to become enlarged and somewhat pear-shaped and the seed to abort. Feeding continues until late July, when the mature larva abandons the enlarged, hollow fruit through a crescent-shaped opening and drops to the ground to pupate in the soil. Shortly thereafter the damaged fruit desiccates and usually falls to the ground.

Chemical control field tests were begun in 1975 with two mist-blower and one ultra-low-volume foliar spray applications. In 1976, seven mist-blower and one ultra-low-volume sprays were applied. Each plot was 0.04 ha in size and contained shrubs averaging 3 m in height. The mist-blower solutions were applied at the rate of 9.1 L (3.1 mL/L active ingredient) per treatment with 4.7 mL of Atplus spreader/sticker added. Ultra-low-volume treatments were made with Turbair oil-base formulations; one containing 1.8% malathion and the other 0.69% resmethrin were each applied at the rate of about 40 mL per treatment. In 1977, ten spray treatments with five insecticides were applied with a mist blower. Plots were 0.02 ha in size and contained shrubs averaging about 3 m in height. Spray solutions were applied at the rate of 4.5 L (3.1 mL/L active ingredient) per plot, with alternate plots treated at half this dosage (1.5 mL/L active ingredient). Chemicals were applied about peak petal drop to reduce bee mortality. Percentage insect control was determined by

TABLE 1

Percentage control of *Hoplocampa lacteipennis* and *Contarinia virginianiae* based on fruit counts on ten 45-cm chokeberry branches selected at random after treatment with 10 insecticides, 1975-77

Material	Dosage a.i.[2]/L	No. fruit attacked by: Total no. fruit 1975	Total no. fruit 1976	Total no. fruit 1977	Midge 1975	Midge 1976	Midge 1977	Sawfly 1975	Sawfly 1976	Sawfly 1977	Control % 1975	Control % 1976	Control % 1977	Phytotoxicity[1] 1975	Phytotoxicity[1] 1976	Phytotoxicity[1] 1977
Diazinon	3.1 mL	1,180	1,797	1,031	0	0	0	4	4	4	100	100	95	M	L	T
Diazinon	1.5 mL	—	—	765	—	—	0	—	—	1	—	—	99	—	—	—
Dimethoate	3.1 mL	—	1,749	—	—	0	—	—	0	—	—	100	—	—	M	—
Malathion	3.1 mL	633	1,342	—	4	0	—	27	0	—	99	100	—	T	T	—
Malathion (ULV[3])	18.0 mL	—	2,222	—	—	0	—	—	21	—	—	100	—	—	—	—
Oxydemeton-methyl	3.1 mL	—	1,732	—	—	0	—	—	0	—	—	100	—	T	—	—
Propoxur	3.1 mL	—	1,509	949	—	1	0	—	0	1	—	100	99	—	T	T
Propoxur	1.5 mL	—	—	1,081	—	—	0	—	—	1	—	—	100	—	—	—
Phosphamidon	3.1 mL	—	2,173	—	—	0	—	—	0	—	—	100	—	—	L	—
Trichlorfon	3.1 mL	—	—	1,105	—	—	0	—	—	0	—	—	99	—	—	T
Trichlorfon	1.5 mL	—	—	1,015	—	—	0	—	—	46	—	—	41	—	—	—
Trichlorfon and oxydemeton-methyl	3.1 mL	—	—	991	—	—	0	—	—	22	—	—	71	—	—	T
Trichlorfon and oxydemeton-methyl	1.5 mL	—	—	852	—	—	0	—	—	3	—	—	96	—	—	—
Ambush	3.1 mL	—	—	1,005	—	—	0	—	—	0	—	—	100	—	—	T
Ambush	1.5 mL	—	—	990	—	—	0	—	—	0	—	—	100	—	—	—
Resmethrin (ULV)	6.9 mL	442	—	—	23	—	—	51	—	—	95	—	—	—	—	—
Control 1		329	1,247	848	30	51	1	68	186	64	—	—	—	—	—	—
Control 2		411	1,975	619	4	1	0	55	120	32	—	—	—	—	—	—

[1] Phytotoxicity: T = trace, L = light, M = medium.
[2] Active ingredient.
[3] Ultra low volume.

The most common insects attacking the fruit of chokecherry are a seed-boring sawfly, *Hoplocampa lacteipennis* Rohwer, and the chokecherry midge, *Contarinia virginianiae* (Felt). The life history of the sawfly was described by Bird (Sci. Agric. 8:497-501, 1928). The adults feed on the nectar and pollen of chokecherries in late May, and the females lay their eggs in pockets cut into the flower calyx. The larva emerges in about 5 days and enters and feeds within the developing cherry, which subsequently dries up and turns black. After molting, the larva enters a second fruit and feeds in a zigzag manner on the outer shell of the seed, eventually boring through the hard shell and destroying the soft interior of the seed. In early August, or about the time the fruit begins to ripen, the larva bores a hole directly to the outside and drops to the ground. It overwinters in the soil and pupates the following spring. The infested cherries ripen along with the sound fruit, but are easily distinguished by the exit hole.

applying Abbott's formula to data obtained by examining the fruit on ten 45-cm branches randomly selected from each of the treatment and control plots approximately 11 weeks later.

The chokecherry midge was less abundant in the general test areas in 1976 and 1977 than in 1975; however, the seed-boring sawfly infestations remained fairly constant. All the insecticides tested gave excellent control over both insect species, except the low-dosage application of trichlorfon, which gave fair control of the seed-boring sawfly (Table 1). No signs of phytotoxicity occurred with the low-dosage applications. Most other applications, however, caused at least a trace of phytotoxicity, occasionally more. Fruit counts from the chokecherry branches sampled in 1977 average 978 berries per treated plot and 733 per untreated plot — 33% more in the treated area. Sprays are most effective when applied during petal drop.—J.A. Drouin and D.S. Kusch, Northern Forest Research Centre, Edmonton, Alta.

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