



Forest Genetics Council Seed Pest Management Program

Project Report, to January 2005:

Name of Applicant/Project Leader Gary G. Grant	For Official Use Only
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Project Title:

Identification of an effective sex pheromone lure for the fir coneworm, *Dioryctria abietivorella*, and demonstration of its efficacy in seed orchards

Approved project funding: \$5,000

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Objectives:

1. To identify the sex pheromone of the fir coneworm and field test components in BC seed orchards.
2. Establish a laboratory colony of the fir coneworm to supply additional insects and female sex pheromone extracts to J. Millar UC Riverside for GC-EAG analysis
3. Conduct flight tunnel or other behavioural bioassays to assess behavioural activity of identified pheromone components to complement field tests.

Results:

1. The colony of fir coneworm established at GLFC in early 2003-04 was maintained and produced small batches of pupae for experimental purposes. Two separate shipments of pupae were prepared and sent to J. Millar in July 2004. Unfortunately, with the heightened security at the USA border and new rules pertaining to shipments of biologicals, these shipments never reached their destination. (They did generate an enormous amount of telephone and e-mail communications and a great deal of frustration). Separate shipments of female pheromone extracts were prepared and shipped successfully to Millar in July 2004. These extracts were assayed by GC-EAG at GLFC prior to shipment to be sure they contained the known major pheromone components. (See report by J. Millar for the outcome of his GC-EAD analysis).
2. Two types of lab bioassays were attempted. The first consisted of a simple "puffing" bioassay in which test materials are introduced into small cages containing several males. Positive



behavioural responses consisted of sexual wing fanning and copulatory behavior. The test materials were synthetics supplied by J. Millar, and female extracts prepared at GLFC. The following treatments have been tested to date: 1) female extract (ca. 1 FE), 2) Z9,E11-tetradecadienyl acetate (known pheromone component) at 1ng/uL, and 3) Z9,E11-tetradecadienyl acetate + the new Millar component in a 1:1 ratio, each at 1ng/uL. The following bioassay results were obtained:

<u>Treatments</u>	<u>Male response (n = 68)</u>
Z9,E11-14:Ac (1 ng/uL)	11.5 % very brief wing fanning behavior
Z9,E11-14:Ac + new component (1:1, 1 ng/uL ea.)	34.5% sustained wing fanning behavior with some copulatory behavior
Female extract (ca. 1FE/ul)	46.2% sustained wing fanning behavior

Although the numbers are based on a small sample of males, the results suggest that the addition of the new Millar component to Z9,E11-14:Ac is synergistic. This would be consistent with the 2004 field trapping results reported by Millar. Also, the combination of the two compounds approached the same level of activity as elicited by the female extract. These bioassays are continuing.

Flight tunnel bioassays were attempted with lab-reared males but so far without success. The issue here is the light level in the tunnel and bioassay room. Too high a light level inhibits male behavior while too low a level makes it impossible to observe the males. We are continuing to adjust the lighting to a workable level, if possible.

Output and Deliverables:

The two key components of the fir coneworm sex pheromone have been identified by Millar. The combination of the two components are attractive in the field and show strong activity in lab bioassays. Further field and lab tests are needed to refine the lure blends and to determine if other components are required to maximize male attraction. It is expected that an operational lure will be ready by the end of the 2005 field season.

Financial:

Although travel was planned for the 2004 field season none occurred, so not all the available 2004-05 funds were expended. It is requested that balance of about \$3,300 be carried forward for the 2005-06 research program.

Employment: None. The cost of personnel involved in rearing coneworms was provided by GLFC.

Signature Block:

Name (Project Leader): **Gary G. Grant**

Signature: _____



2004-2005 Financial

	Quarter				Total Year
	1 st	2 nd	3 rd	4 th	
a) Salaries and benefits					0
b) Equipment					0
c) Travel					0
d) Materials & supplies		\$2,137.78		\$2,158.26	\$4,296.04
e) Other expenses: courier & customs		\$ 247.96			\$ 247.96
f) Administrative Costs					0
TOTALS		\$2,385.74		\$2158.26	\$4,544.00

BC MoF Funds carried forward from 2003-04: \$2,844.00
 BC MoF Funds received for 2004-05: \$5,000.00

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 Total funds available in 2004-05 \$7,844.00

Expenditures to date (Jan 15, 2005):

Insect diet and rearing materials: \$-2,137.78
 Courier and customs for shipments to Millar: \$ -247.96
 Pheromone traps for 2005 season: \$-2,158.26 (estimated, invoice not received yet)

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 Total expenditures 2004-05 \$-4,544.00

Funds not expended in 2004-05: \$3,300.00



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