Defoliation

Three methods of estimating defoliation, excluding aerial assessment, are currently in use: ground assessment with binoculars, the Fettes method, and the Dorais-Hardy method. Information presented here comes directly from Sanders (1980).

Objective:

1. To evaluate the current state of a tree or stand.
2. To assess efficacy of spray applications.
3. To supplement one of the sampling techniques that directly coundts the number o budworms.

Time of Year: The defoliation ranking is determined after the host species foliage is fully flushed out and after most of the budworm feeding has occurred. This is generally from late June through August, depending on location.

Equipment Needed: Binoculars, illustrative key to defoliation categories, data sheets categories, data sheets.

Procedure:

1. **Ground Assessment With Binoculars:** Observations are made from the ground with the field worker using 7X or 8X binoculars

[redacted]

and standing less than 50 m from the sample tree. Defoliation is rated using one of the methods described here.

Method A: Categorize the state of the foliage on the upper two fifths of the crown as follows:

--**Excellent (E):** A rapid look gives the impression that the tree has suffered little or no defoliation; 75% or more of the current growth remains on the tree.

--**Poor (P):** Some new green foliage can be seen, but it is improbable that the tree could survive many years with so little new foliage added

--**Very Poor (VP):** Only after a careful examination of the crown are any green shoots visible

2. **Fettes Method:** This method, first described by Fettes (1950), involves obtaining branches from the mid-crown of balsam fir and then visually estimating the percentage of needles removed from each current-year shoot on the branch (See Figure 3). These are then averaged to provide a percent defoliation for the whole branch.

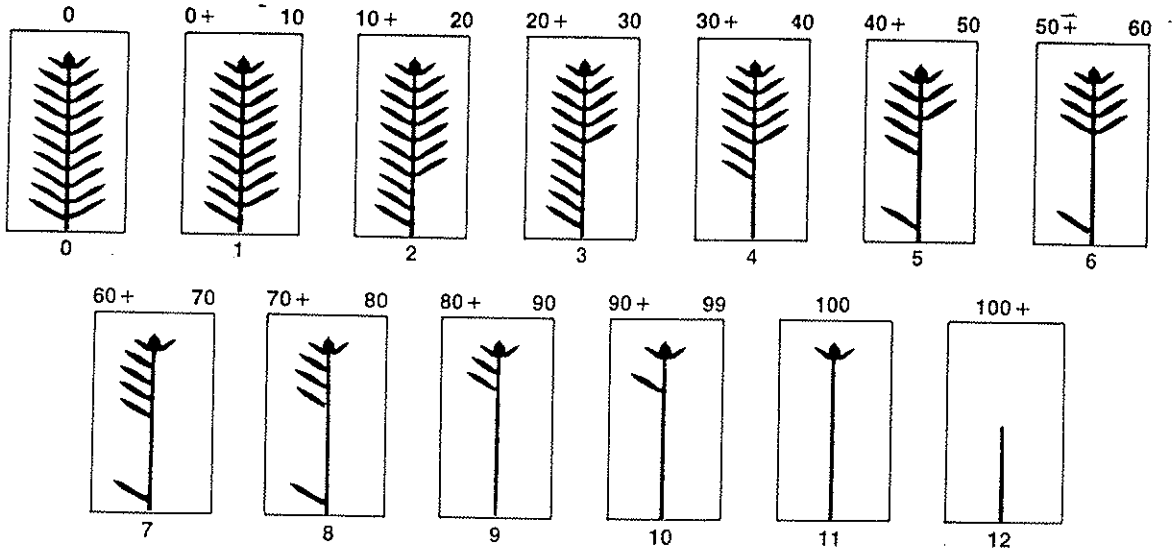

Figure 3. Fettes (1950) method of estimating defoliation. Top figures are % defoliation, bottom are defoliation categories (from Sanders, 1980).

3. **Dorais-Hardy Method:** This method, described by Dorais and Hardy (1976), was devised for balsam fir in which high populations of budworm have prevented normal bud development. It therefore takes into account damage to buds as well as to foliage. The percent of buds missing (%Brg) is recorded in addition to the percent defoliation (%Def). The form (Figure 4) is designed to estimate defoliation before and after spraying.

(i) **Defoliation before spraying:** This is recorded in the upper half of the form (Figure 4). Only last year's three terminal shoots are considered (those circled by the dotted line in the illustration, Figure 4).

a) Each shoot normally has three (or occasionally more) terminal buds. These are marked as present (1) of absent (0). Where there are more than three present

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date :

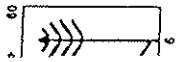
Spruce Budworm Defoliation Data Sheet
For Use in Binocular Assessment

Method A: Categorize the state of the foliage on the

Method B: This method of binocular

Spruce Budworm Defoliation Worksheet Data Sheet
For Use With Fettes Method

Plot Number



Tree Species _____ Tree Number ____

Branch | Defoliation | Percent of

Tree Species _____ Tree Number ____

Spruce Budworm Defoliation Data Sheet
For Use With Dorais-Hardy Method