

Spruce Spider Mite

Oligonychus ununguis (Jacobi)

Acari: Tetranychidae

McGraw, J.R.; Hain, F.P. 1979. Spruce spider mite sampling system: Instructions for use. *NC State University Agricultural Extension Service School of Forest Resources*. 4 pages.

Objective: To provide a sequential sampling system for estimating *O. ununguis* densities and timing insecticide applications before significant damage occurs.

Abstract: The spruce spider mite, *Oligonychus ununguis* (Jacobi), can be a significant pest of Fraser fir, *Abies fraseri* L., Christmas tree plantations. Infested needles become yellow-spotted and webbed together after which time they turn brown and fall prematurely from infested trees. Growers often depend on pre-budbreak insecticide applications for control of the balsam woolly adelgid, *Adelges picea* (Ratzeburg), to also provide season long *O. ununguis* control. However, mite populations rebound quickly following spring applications and subsequent treatments may be warranted.

A detailed sequential sampling system for estimating *O. ununguis* populations and damage was developed. When the cumulative count of infested trees equals or exceeds the threshold for control in Table 1, then apply control measures. Conversely, if the cumulative count of infested trees is less than or equals the threshold value for no-control in Table 1, then control measures are not warranted. If 50 samples have been taken (1 sample = 1 lateral branch taken from the upper third of the live crown) without reaching a decision, a combination of additional factors must be considered before making a decision. Re-sampling should be done every 2 weeks from April 1st through October 30th.

Sampling Procedure: Delineate permanent, square blocks containing 1000 ± 25 trees throughout the plantation, of uniform slope, tree age, and density. For each block, use the "Field Survey Form" specifically developed to keep track of each spider mite survey throughout the season. For example, counts from the first survey would be entered under column A in the form (see Figure 1), counts from the second in column B, etc. Select sample trees randomly from all areas of the block, always moving perpendicular to the slope. At each sample tree, examine a randomly-selected, unshaded lateral shoot (with a terminal bud) in the upper third of the live crown for presence or absence of spider mites. In spring before shoot elongation has occurred, examine the last 1.9 cm of the previous year's growth. After shoot elongation has occurred, examine the last 1.9 cm of the current year's (new) growth. Examine both sides of the branch, sampling only one branch per tree. Do not count spider mites or eggs, simply tally spider mites as present (1) or absent (0). Sampling stops when the cumulative count of infested trees exceeds or is less than either the value on the left-hand-side of the survey form for control or the value on the right-hand-side of the survey form for control (Figure 1), respectively. If all 50 trees have been examined

without a decision, several additional factors must be considered before making a decision. If trees in the block are scheduled for harvest during the following year, apply an insecticide. If the entire block has a history of spider mite problems, apply an insecticide. If the majority of infested trees in the block occur in a localized area, apply an insecticide to that hot spot. Otherwise, do not apply an insecticide.

Notes: Avoid doing the survey when foliage is wet as spider mites are difficult to see. A sketch map of each block used is helpful for determining areas infested by spider mite as well as keeping track of any insecticide applications. A hand lens or magnifying glass may be useful for identifying spider mites.

Table 1. Sequential survey for spruce spider mite to determine if control measures are warranted.

Field Survey Form Control Decision Boundaries		
No Control	No. of Samples	Control
---	1	---
---	2	---
---	3	---
---	4	---
---	5	---
---	6	---
---	7	---
---	8	---
---	9	---
---	10	10
---	11	10
---	12	11
---	13	11
---	14	11
0	15	12
0	16	12
0	17	13
1	18	13
1	19	13
1	20	14
2	21	14
2	22	14
3	23	15
3	24	15
3	25	16
4	26	16
4	27	16
4	28	17

5	29	17
5	30	18
6	31	18
6	32	18
6	33	19
7	34	19
7	35	19
7	36	20
8	37	20
8	38	21
9	39	21
9	40	21
9	41	22
10	42	22
10	43	22
11	44	23
11	45	23
11	46	24
12	47	24
12	48	24
12	49	25
13-17	50	21-25

Table 1 and Figure 1 reprinted with permission from McGraw, J.R.; Hain, F.P. 1979. Spruce spider mite sampling system: Instructions for use. *NC State University Agricultural Extension Service School of Forest Resources*. 4 pages, March 20, 2001.

No Control	Running or Cumulative Totals											Control	
	A	B	C	D	E	F	G	H	J	K	L		M
4													16
4													16
4													17
5													17
5													18
6													18
6													18
6													19
7													19
7													19
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9													22
10													22
10													22
11													23
11													23
11													24
12													24
12													24
12													25
13-7													21-5



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Fig. 1. Continued.