



COMMUNITIES PROJECT FOR HIGHLAND BIODIVERSITY

Rhododendron Control: Lever & Mulch

Follow-up work – one year after initial application

As part of this Morvern Community Woodlands project, in April 2008, Technical Development Branch of Forest Research was contracted to undertake a time study of the Lever & Mulch method of eradicating *Rhododendron ponticum* in Fiunary Forest, Morvern. **Internal Project Information Note (IPIN) 27/08 applies.**

Follow-up work in this same study area (measured as 0.04ha) was undertaken on 19th March 2009 by Gordon French (the original operator), and was recorded by Donald Kennedy, both of Morvern Community Woodlands.

Summary:

One year after the initial work, living *Rhododendron* material of one kind or another was found at 24 points in the study area. This equates to 600 per hectare. 11 of these consisted of shoots arising from *stumps whose stems had been cut* just above the root-collar area. 9 consisted of *rooted-layer* type material that had been accidentally missed or incompletely uprooted in the first treatment. One was a *medium-sized plant* that had been fully prepared for uprooting in the first treatment, but had been left unfinished. Another had simply been missed entirely. One was a patch of (27) tiny *seedlings* and the other was a large uprooted stem whose *rootball* had just managed to hang on to life over the period.

All were treated easily, calmly and efficiently with a simple hand hammer (or by levering missed stems or uprooting missed layered sections) to the point that the operator was satisfied he had killed them and that no further *Rhododendron* material would arise from these particular nodes in future. This follow-up process took less than 22 minutes to cover the full study area - equating to just over 9 hours per hectare.

Method:

At each point where live material was found in the study area, the recorder assigned a number and 'type' code (see below) and the operator counted the number of living (and dead, where applicable) 'regrowth' shoots from cut stumps, or older stems that retained some rooted connection(s) and remained alive, or fragments or sections of rooted 'layered' material, etc... as applicable. The longest and shortest shoots (or stems, etc) were measured with a tape, a number of photographs were taken, and all such details were recorded before any actual follow-up work at that point was instigated. DK started a digital stopwatch at the moment GF began work and (if there was sufficient time), took a number of photographs during whatever particular process was undertaken by GF - until he announced that the job was done there. DK recorded the time taken for the work, but kept the stopwatch running until GF had reached the next point/ plant to be treated. Thereby 'between-plant' access time was also recorded. Then DK also made his way to the next plant - whereupon the process was repeated. In this way the initial describing/ counting/ measuring/ photographing/ and recording operations at each plant were separated from the work and access operations. Table 1, overleaf, is the full record of all the relevant details.

The 'Types' of material encountered:

A – Cut stump left in the ground. Regrowth shoots arising from root-collar buds.

B – Regrowth shoot(s) arising from a rooted-layer 'node' (or small network of such material) that had been left in the ground. Some had a number of (root-with-root-collar) 'nodes' and therefore a number of separated shoots (or groups of shoots) along their length. Most of these had simply been overlooked or incompletely finished-off during the initial operation.

C – Seedlings

D – Plant (any size or form – apart from layers, as above) accidentally missed in 1st operation.

E – Stem uprooted in 1st operation, but rootball still surviving, with some weak shoots.

Results:

In the 400m² study area the most common 'type' of living Rhododendron after one year, was **Type A**. 11 stumps that had been cut (leaving some bud-bearing material), had live shoots. The largest number of shoots found on any one stump was 31, the smallest was 1 and the average was 16. Amongst these 11 stumps, the longest shoot averaged 41.27cm; the shortest 9.27cm (max. 70cm; min. 2cm). Four of these stumps also carried some shoots that had died during the year (two stumps had 1 dead shoot each, one had 12 and the fourth had 14)... Cause of death was not ascertained, but most appeared to have suffered some sort of insect damage to leaves (holes, blisters), surrounded by blackened areas (often covering entire leaves) and when topmost leaves were affected badly in this way, growing tips appear to have died.

All these **Type A** stumps were treated by removing all the shoots (either by hand or with a hammer blow) and **thoroughly bruising all the (most sensitive) bud-bearing material in the remaining root-collar area, with a small hand hammer**. A few were also mulched (when material was conveniently at hand), but this was never considered to be truly necessary.

The average time taken for this treatment was 53.7 seconds (max. 80 sec, min. 24 sec).

9 rooted-layer (**Type B**) 'nodes' or mini-networks remained alive in the study area. These had been overlooked or incompletely uprooted in the initial operation. Some were quite large stems that had originally been severed from the rest of their parent plant, leaving one or more small root 'nodes' intact and remaining able to sustain the stems. Apart from one (plant 3) – which was hammered and mulched (it bore only one small shoot, but had quite a deep root-node with no remaining section of stem to use as a lever or to twist the root system out of the ground) – these were all simply and easily uprooted (as they should have been in the first treatment). The most difficult of these (plant 23) took 84 seconds to uproot completely, the easiest (plant 19) took some 2 seconds. On average, these layer-type plants took 31.9 seconds to pull out of the ground.

One patch (approx 0.5m²) of seedlings (**Type C**) was found in the study area. All were close together in a mossy bed protected by a tree rootplate. 27 were counted. They were rubbed out by hand.

Type D: One medium-sized plant with two main stems arising from the ground (6cm & 8cm diameter at ground level) had been cut to good lever lengths (2m & 4m, approx.) and released from all surrounding material (i.e. it had been completely prepared for uprooting), but the final operation had been neglected in the first treatment. Another medium-sized plant (with a smaller offshoot stem) growing on top of the rootplate of a fallen tree, had been completely missed. These were easily levered out of the ground with roots intact, & turned upside-down (each in less than a minute), during this follow-up visit.

One large stem with a large rootball that *had been* successfully levered out of the ground on the first occasion still survived and had a few weak living shoots from the main root-collar area (**Type E**). It had slipped off its supporting brush pile, had not fully dried out and some roots had reconnected with the ground below. It took a matter of seconds to roll the whole thing over and support it off the ground. Shoots were removed & some more soil kicked off the rootball.

Distances between specific bits of Rhododendron surviving in the study area were not measured or estimated, but the time taken to access each subsequent plant from each one treated, was recorded. Two sets of different 'types' of material were so close together they were timed as for one point (nos. 10 & 11 and 13 & 14). Over the resulting 22 points, **the average between-plant access time was 15.7 seconds** (max. 79 sec, min. 1 sec).

The **total work time to treat** all living plant material found was **16 minutes 21 seconds** and the **total between-plant access time** was **5 minutes 29 seconds**.

Thus the complete follow-up operation over this 400m² area took **21 minutes 50 seconds** in total. This equates to **9 hours 6 minutes per hectare**, assuming similar density of regrowth and numbers of missed plants, etc.

DK April 2009

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Table 1.

Plant No.	Type	No. of Shoots /stems /s'lings	No. of dead shoots	Length (cm) of Shoots		Time to treat Plant (sec)	Time to access next Plant	Photo nos.	Notes
				Max	Min				
1	A	21	1	70	15	73	11	1020379-392	
2	A	31	0	44	8	76	7	393-402	
3	B	1	0	25	25	47	19	403-409	Small rooted layer node left in ground. Root collar hammered and node mulched
4	A	20	0	30	4	56	18	410-428	
5	A	16	0	45	4	24	3	429-438	
6	A	16	14	45	8	61	13	439-448	
7	A	5	0	18	10	37	23	449-457	
8	A	1	1	21	21	33	17	458-465	
9	A	17	0	33	10	71	17	466-476	Big stump. Hammered and mulched as well.
10	A	21	0	45	5	126	12	477-506	Cut stump with large layered stem broken & unfinished on 1 st visit. Treated & timed together. Stump hammered & mulched (80sec), stem uprooted (46 sec).
11	B	17	0	23	2				
12	A	17	12	60	2	55	20	507-521	
13	B	3	0	8	8	14	4	522-532	Patch of tiny seedlings adjacent to rooted layer with 3 shoots overlooked on 1 st visit. Seedlings rubbed out of moss patch (9 sec). Layer uprooted (5 sec).
14	C	27s'lings	0	1	<1				
15	D	2 stems	0	180	40	18	32	533-540	2-stemmed plant growing on rootplate of fallen tree. Missed on 1 st visit. Easily uprooted
16	B	1 stem	0	0	0	37	3	541-546	1 sprawling stem with 3 branches. Root node on fallen trunk overlooked. Easily uprooted
17	B	1 stem	0	0	0	24	14	547-552	4m (cut) stem left hanging, but still connected to ground by 3 small layers. Easily uprooted
18	A	10	0	43	15	25	1	553-560	Includes adjacent t(connected) small layered stem. Treated together as one plant
19	B	1	0	40	40	2	1	561-563	
20	B	1 stem	0	20	20	7	1	<i>no</i>	
21	B	1	0	15	15	49	12	<i>further</i>	
22	D	2 stems	0	0	0	54	79	<i>photos -</i>	2 stems (base diam 6 & 9 cm), cut @ 2m & 4m & released but not uprooted on 1st visit
23	B	4	0	75	4	84	22	<i>"memory</i>	4 shoots in 3x3m area – all from 1 straggling sub-surface layered stem 'lattice'
24	E	15	0	15	5	8		<i>card full"!</i>	Large stem cut & uprooted on 1 st visit, but rootball left in ground contact & still (just) surviving. Rolled over & supported off ground. Weak shoots (& some soil) knocked off.
						Treatmt	Access		
Total times for whole study area:						981s	329s		
						or:	16m 21s	5m 50s	
Total follow-up working time for study area:						21 min 50 sec			