



Biomass Partitioning Protocol

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Biomass Partitioning Protocol

Aims

To record how above ground growth is partitioned into the branches, shoots and the stools of individual SRC plants growing under different site conditions.

- To collect data for use in shoot architecture studies.
- To record below ground biomass of individual SRC plants.
- To collect soil and root samples for lab. analysis of root size distribution to a depth of ~1m

A trial run of this protocol should be carried out prior to the full assessment starting. The assessment should be carried out before bud burst.

Sampling intensity

1 stool x 3 blocks x 6 varieties = 18 stools per site

18 stools x 6 sites = 108 stools in total.

108 stools x 9 shoots = 972 shoots

108 stools x ?? branches = depends on the number of branches per shoot.

3 soil/root cores per stool x 108 stools = 324 cores

324 x 10 = 3240 10cm soil/root samples

Selecting stools and shoots for assessment

Data collected during the 2001/2002 diameter assessment will enable Mensuration Branch to identify a 'small', 'medium' and 'large' stool of each variety at each site on the basis of the number of shoots per stool. The assessment team will be given the stool number to be assessed on each plot of each variety at each site (Table 1). Mensuration Branch will also categorise shoots on the selected stools as 'small', 'medium' or 'large' according to the diameter distribution of the shoot population on each stool. Three representatives of each category will be selected on each stool for further measurement. The diameter range covered by each shoot size category for each stool will be issued to the assessment team by Mensuration branch (Table 1).

Assessing shoot and branch biomass

Non destructive element

The total number of live and dead shoots on each selected stool is recorded. Three shoots from each size category (small, 'medium' or 'large') are selected. Following the standard ETSU length assessment protocol, sample number, size class, shoot diameter at 10cm and 1m, length to 1m and length to tip are recorded. A record of midpoint diameter is also taken (Form 1). These shoots are clearly marked with their sample number.

Destructive element

All shoots present on the stool are then removed and sorted according to their size class. The total green weight of each size class is then taken (Form 2).

All live branches on each of the 9 shoots are assessed for length, basal diameter and midpoint diameter (Form 3). The green weight of each branch is taken in the field. Individual branches should be labelled with site no., EDC number, variety name, stool size, shoot number, branch number (branch number 1 being the branch lowest down on the shoot) and placed in labelled plastic bags. Individual, de-limbed, shoots are then weighed (Form 1) and labelled with site number, EDC number, variety name, stool size and shoot number and stored in heavy paper sacks (potato sacks) bearing the same information. Shoot and branch samples are sent to Alice Holt for oven drying and their dry weight is recorded (Forms 1 and 3).

If there are less than 9 shoots on the selected stool, all shoots should be measured.

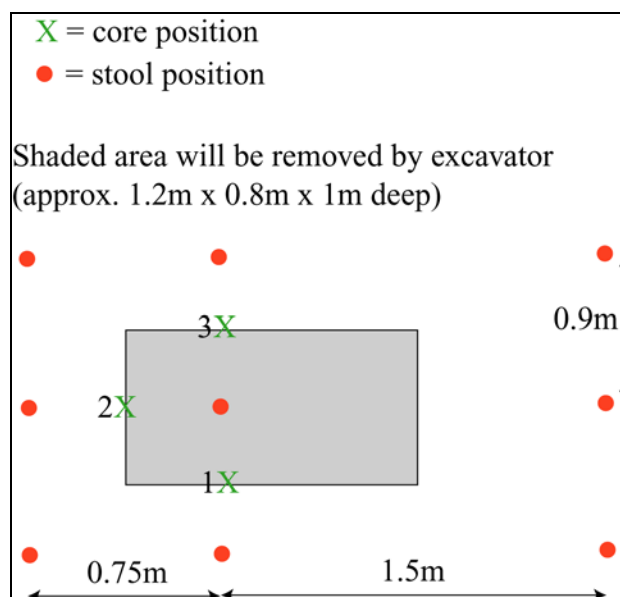
Assessing stool diameter and height

Once all shoots have been removed the diameter of the stool is recorded across its widest and narrowest points (diameter 1 and diameter 2 on the form). A clear mark should be made at the point where the stool emerges from the ground. The height of the stool is recorded from ground level to the highest point. (Form 4)

Taking undisturbed soil/root cores

Undisturbed soil/root samples are taken using a corer. The corer is pushed into and removed from the ground using a JCB excavator or similar. Three soil cores are taken around each stool (see fig. 1 for position and numbering). Soil cores are stored in plastic containers labelled with site number, EDC number, variety name, stool number, stool size and core number and sent to Alice Holt for further analysis. The protocol for assessing these samples is covered in a separate document.

Fig 1. Positioning of undisturbed soil/root cores.



Taking destructive root samples

Using the excavator, the stool and root system of the target stool are to be removed from the ground as carefully as possible, retaining as much of the root system as possible. The aim is to remove the roots and soil in a volume measuring 1.2m long x 0.8m wide x 1m deep using a single scoop of the excavator's bucket.

The stool is removed from the root system at the point previously marked and its green weight is recorded in the field (Form 4). The stool is labelled with site number, EDC number, variety name stool number, and stool size, placed in a heavy paper sack bearing the same information and sent to Alice Holt where it is oven dried and its dry weight is recorded.



Removing soil from excavated root system using compressed air

Using an air knife, all soil should be removed from the root system. The root system should then be weighed using a spring balance attached to the bucket of the excavator. Once the green weight of the root system has been recorded (Form 5), it is cut up with loppers and the material stored in paper sacks labelled with the site number, EDC number, variety name, stool number and stool size and sent to Alice Holt for oven drying and its dry weight is recorded.



Excavated stool and root system after cleaning with compressed air

Collected data

All paper records of the data collected during this assessment should be sent to Ian Tubby at Alice Holt. The assessment team should keep duplicates until all of the data has been entered onto the Alice Holt network.



Tables and forms

Table 1: Example of information to be supplied to assessment team by Mensuration Branch

Site no.	EDC no.	Variety name	Stool size	Stool no.	Diameter Range of 'small' shoots @ 1m (mm)	Diameter Range of 'medium' shoots @ 1m (mm)	Diameter Range of 'large' shoots @ 1m (mm)
42	1	Beaupre	S	6	1 - 9	9.1 - 20	20.1 +
42	4	Beaupre	M	31	1 - 10	10.1 - 25	25.1 +
42	7	Beaupre	L	16	1 - 10	10.1 - 27	27.1 +
42	2	Ghoy	S	23	1 - 5	5.1 - 15	15.1 +



Form 1: Shoot form and weight assessment.

Site: 42.

EDC: 1.

Variety: Beaupre.

Stool size: M.

Total number of live shoots: 21.

Total number of dead shoots: 7.

Sample (shoot) no.	Size	No. of branches	Diameter @ 10cm from (mm)	Diameter @ 1m from (mm)	Midpoint diameter (mm)	Length to 1m (m) 2d.p.	Length to tip (m) 2d.p.	Green weight (shoot only) (g) 1.d.p	Dry weight (shoot only) (g) 1.d.p
1	S	6							
2	S	9							



Form 2: Shoot green weight by size class

Site no.	EDC no.	Variety	Stool size	Total 'Small' shoot + branch green weight (g) 1.d.p	Total 'Medium' shoot + branch green weight (g) 1.d.p	Total 'Large' shoot + branch green weight (g) 1.d.p
42	1	Beaupre	S			
42	4	Beaupre	M			
42	7	Beaupre	L			
42	2	Ghoy	S			



Form 3: Branch form and weight assessment

Site: 42.

EDC: 1.

Variety: Beaupre.

Stool size: M.

Shoot no.	Shoot Size	Branch no.	Basal diameter	Midpoint diameter (mm)	Length to tip (mm).	Green weight (g) 2.d.p	Dry weight (g) 2.d.p
1	S	1					
1	S	2					

**Form 4: Stool diameter, height and weight assessment**

Site no.	EDC no.	Variety	Stool size	Diameter 1 (mm)	Diameter 2 (mm)	Stool height (mm)	Green weight (g) 1.d.p	Dry weight (g) 1.d.p
42	1	Beaupre	S					
42	4	Beaupre	M					
42	7	Beaupre	L					
42	2	Ghoy	S					



Form 5: Root weight assessment

Site no.	EDC no.	Variety	Stool size	Green weight (g) 1.d.p	Dry weight (g) 1.d.p
42	1	Beaupre	S		
42	1	Beaupre	M		
42	1	Beaupre	L		
42	1	Ghoy	S		