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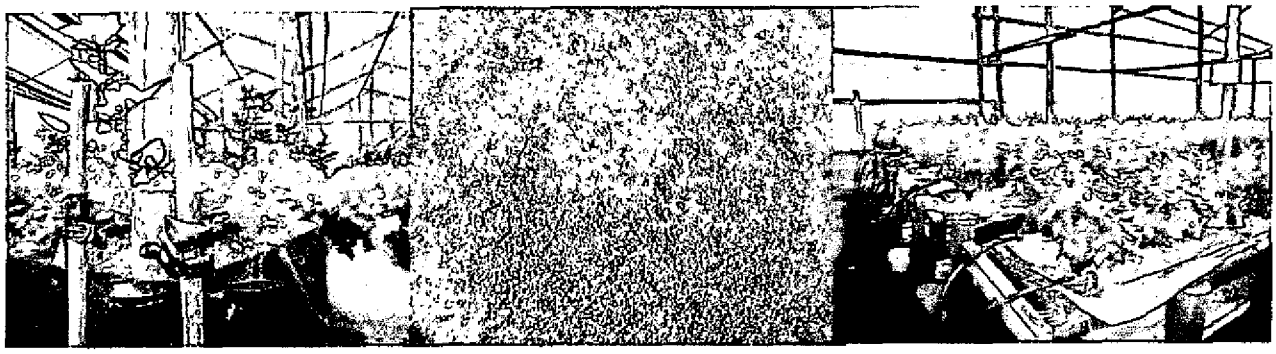
PROGRESSIVE REPORT ON

THE RESEARCH PROJECT TO IDENTIFY SUITABLE LOCAL MATERIALS TO BE USED AS SUBSTRATES BY UGANDAN FLOWER GROWERS



Phase out of Methyl bromide in cut flowers

UNIDO PROJECT MP/UGA/01/126/11-57

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UFEA

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1.0 Background

Since 2004 UNIDO has been supporting activities of UFEA related to the phasing out of methyl bromide in cut flowers in Uganda. This research is in line with the UNIDO's mission to support the Ugandan Flower Exporters' Association (UFEA) into finding alternatives to the use of Methyl bromide. Methyl bromide has been used a lot by flower growers to control soil pathogen. However, because of its deleterious effects to the environment and the humans, it was banned.

Methyl bromide had been the most effective pesticide against the soil borne pathogens, with its banning, growers had to look at possible alternatives to methyl bromide. Metham Sodium is being considered but though less dangerous than methyl bromide it is dangerous too. Thus metham sodium has been looked at as a short-term substitute for methyl bromide. To the growers, getting out of soil seems to be the only long-term solution to soil pathogens. However, the cost of growing in out of soil is rather prohibiting. One sure way of reducing the cost is by sourcing for cheap substrates.

There are various substrates used in soilless cultures all over the world. In Uganda, substrate systems are a new practice, and widely used for substrate is cocopeat. The coco peat is imported from Sri Lanka and this makes it rather expensive. UFEA members thus expressed need to identify locally available alternatives to cocopeat.

The objective of the project is to identify local materials with similar performances as the proven cocopeat. Criteria for choosing the right material are as follows,

- Local availability
- The material should be sufficiently available: on average, 300,000 liters of substrate are required per hectare (5 litres per plant, 6 plants per square meter). With an average crop replacement time of 4 years, about 12,000 m^3 of substrate should be available to cover the needs of the actual surface cultivated with roses.
- Cheaper to obtain and transport than the imported cocopeat
- The production of the material should not imply significant environmental impact.

- The materials should be recyclable or reused after a season of cropping or its disposal should not have significant negative environmental impact

The implementation of the project was done in three phases.

Phase I comprised of identifying possible locally available materials, analyzing materials to determine their biological stability, the physical and chemical properties. Thus determine their suitability as substrate for cut roses. 11 materials were tested in phase I. These included,

1. Rice husks
2. Papyrus
3. Rose compost
4. Vermiculite
5. Bagasse
6. Cotton hulls
7. Coffee husks
8. Kasese stones
9. Kabale cinders
10. Murrum
11. Mbale stones

Phase II Six materials were dropped out of the experiment after the results from phase I tests indicated that they were not suitable as growing media. 5 of the tested materials were found to be of seemingly suitable properties for growing, these were then subjected to bioassays / toxicity tests. The bioassays were conducted with Chinese cabbages as the phytotoxicity indicator. Materials tested in phase II included,

1. Cotton hulls
2. Bagasse
3. Kabale cinders
4. Kasese stones
5. Murrum
6. Cocopeat as the reference or control.

The germination and growth performances of the materials were analyzed in comparison with cocopeat. Results from the bioassays were used to further select for the well-suited materials

Phase III is purposed to study the performance of roses on the proven materials from the previous tests. At this stage 3 materials are being tested. These are, murrum, Kabale cinders, Kasese stones and cocopeat as the control / reference.

2.0 Justification

The flower industry in Uganda is mainly dominated by rose production. Unlike other ornamental roses do have longer cropping periods of around of 4-6 years per crop. Though the substrate materials to be studied had proved some suitability in the prior tests, it was deemed necessary to ascertain the performance of roses on the materials. Thus the need for phase III - Growth trial of roses on the pre selected substrate materials.

A report covering activities and results from phase I and II was submitted by Nieves Garcia Victoria in October 2005.

This report describes methodology of setting up the rose growth trials on the pre-selected materials, methods of data collection and parameters of performance being studied.

3.0 Methodology

Two UFEA member farms Melissa Flowers and Belflowers offered planting material, space and skilled manpower to conduct the trials. The hosting farms chose and provided the trial varieties. Two rose varieties were tried per farm. At Melissa Rosa Frisco and Rosa Dream were planted for the trials while at Belflowers Rosa Goldie and Rosa Red giant were chosen for the trials.

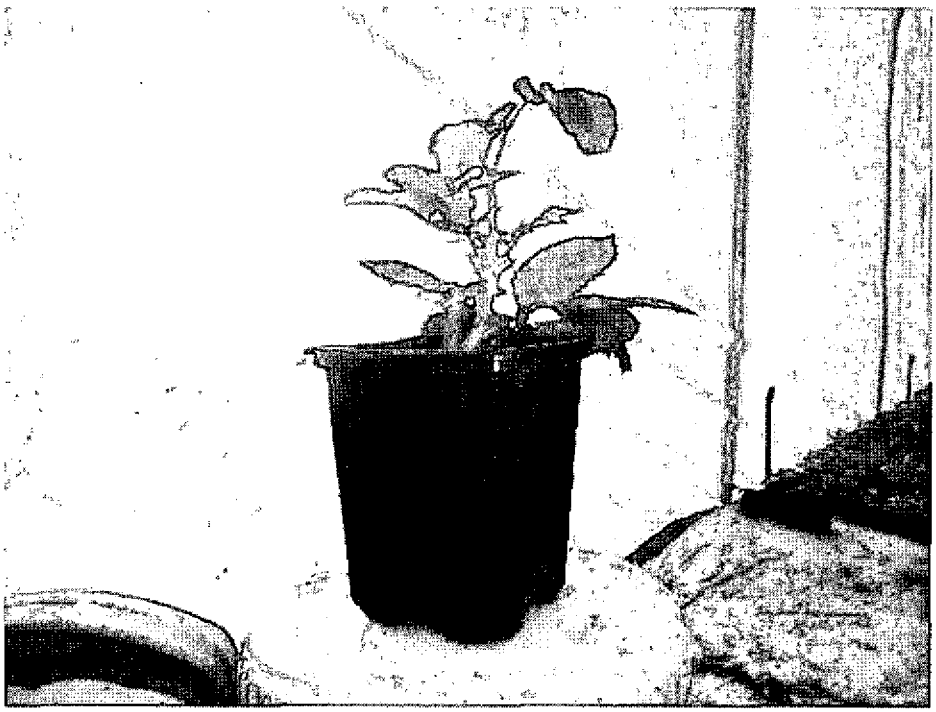
Substrate materials were delivered to the farms, sized, sieved and placed into bags for Melissa and troughs for Belflowers.

At Melissa 192 m^2 of area were planted while at Belflowers 244.8 m^2 were planted at a plant density of 6 plants per m^2 on both farms.

3.1 Planting materials

Eight- weeks old plantlets in form of stentlings and cuttings on self-root were planted at Melissa and Belflowers respectively. (See figure 1) The hosting farms raised the planting materials. Natal brya was used as rootstalk material at Melissa Flowers.

Figure 1 Planting material

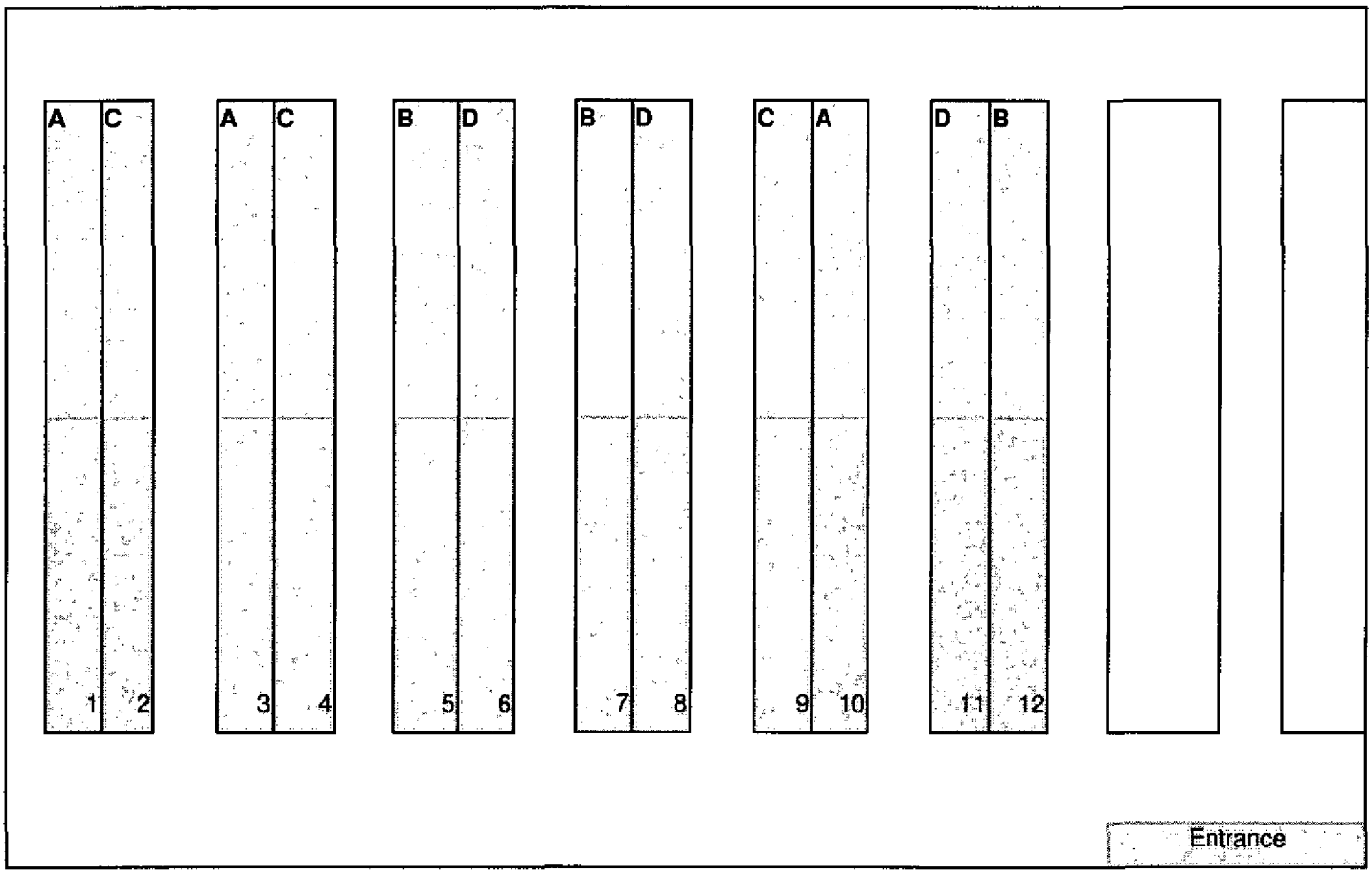


3.2 Field lay out

The field lay out was randomly determined by throw of paper. Figures 2 and 4 show the random distribution of substrate material in the green houses.

Three replicates and two replicates of each substrate material were made at Melissa flowers and Bel flowers respectively.

Figure 2 Trial field lay out at Melissa



Substrate description

- **A** Cocopeat
- **B** Kabale Volcanics
- **C** Kasese Volcanics
- **D** Murrum

Variety description

- Rosa Frisco
- Rosa Dream

3.3 Planting Procedures

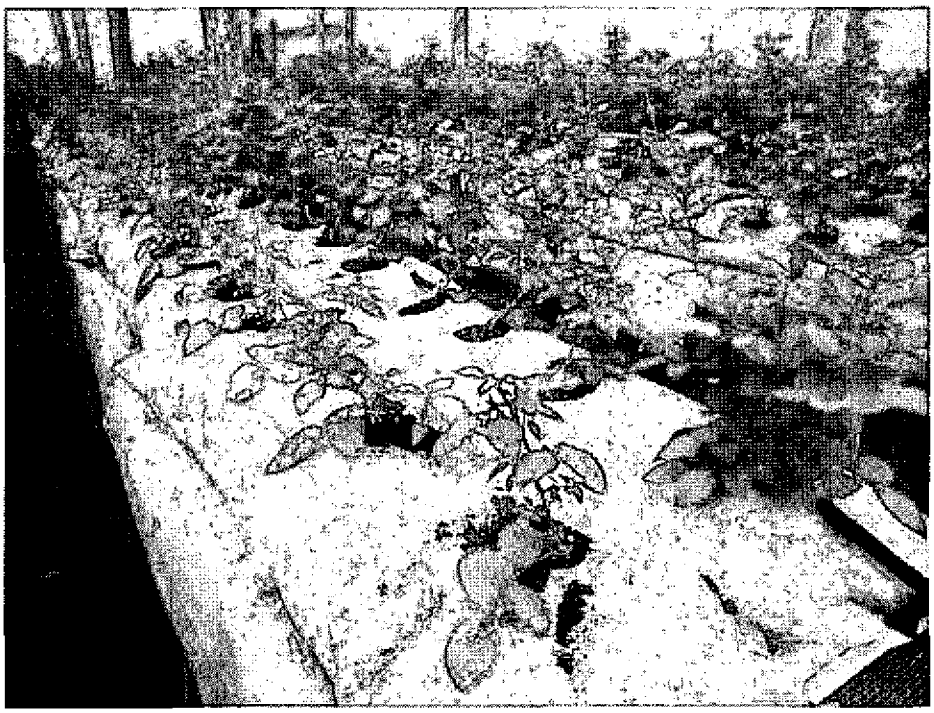
3.3.1 Melissa Flowers

Trials were planted on 6/9/06.

Bags of 1m-length and 20cm width were staffed with the substrate material and laid on raised beds made out of wooden poles. Bags were placed on the beds in two lines of 14 m length. Every line of Stentilings of the selected rose varieties were planted in the bags at

a spacing of 20 cm. For the 12 beds at Melissa, rosa Dream was planted on the first 7m from the entrance of each bed and rosa Frisco on the remaining 7 m. Refer to figure 3.

Figure 3 Trial roses at Melissa flowers



3.3.2 Belflowers

Trials were planted on 11/01/06 in open troughs of 20.4 m length x 0.2m height x 0.4 m width. See figure 5. The troughs were placed on raised beds made in form of a wooden rack, filled with ¼ inch stones up to 3cm depth and topped with the substrate materials. The ¼ inch stones were for improving aeration and drainage within the troughs. Two rows of roses were planted along the bed with a spacing of 20cm between the plants. The right hand side row on every bed was planted with Rosa Red giant while the left was planted with Rosa Goldie.

Figure 4 Trial lay out at Belflowers

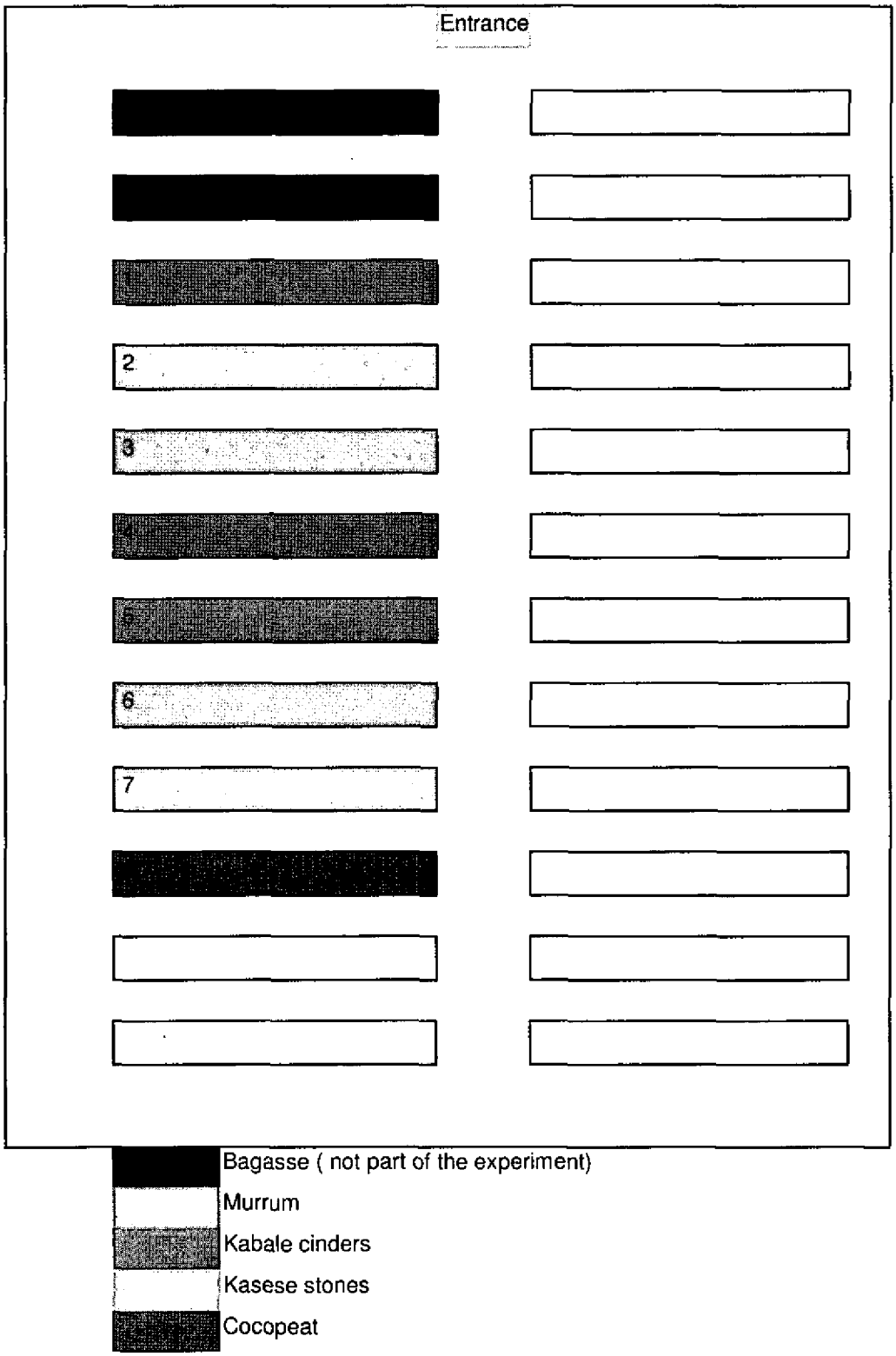
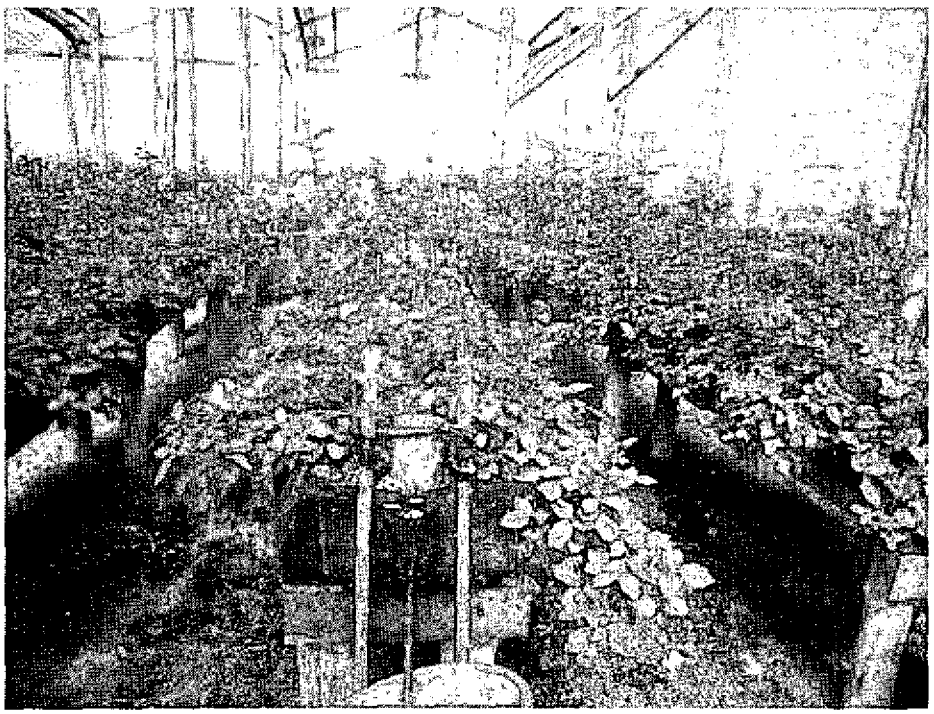


Figure 5 Trial roses at Bel flowers



4.0 Crop management, Harvesting and Data collection

All agronomical practices are executed in the same way as in the commercial greenhouses.

Trials at Melissa Flowers came into production at the end December 2005. Trials at Belflowers are not yet in production.

At Melissa, saleable stems are harvested at the normal cutting stage. Stems from the first and second bag on each row are not recorded. Stems from the remaining bags are counted, measured in length and weighed as a bunch. Weight and numbers are registered on a daily basis while stem length is measured once a week from randomly picked stems per bed.

The data collected when analysed will give information of the varieties' performance in terms of quantity (stems per m2), quality (stem length and weight) on the tested substrate in comparison to varieties performance on cocopeat.

4.1 Irrigation and Fertigation

The irrigation and fertigation is done as that for the rest of the farm. The PH, and EC of dripping solution and drainage is monitored however, the system in place cannot allow for adoption of the feeding program to specific substrate requirements

5.0 Data Analysis

Data collected shall be analyzed per bed. Currently, it is too early to analyze any data. Trials at Bel flowers are not yet in production and those in Melissa are hardly three months in production.

6.0 Annex I Data collection forms

For registration of stem length (quality)

		Bed number											
Date	Stem	1	2	3	4	5	6	7	8	9	10	11	12
	1												
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	9												
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	11												
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	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												

For registration of the number of stems and weight of stems

	Bed 1		Bed 2		Bed 3		Bed.....12	
	No. of stems	**Weight**	**No. of stems**	**Weight**	**No. of stems**	**Weight**	**No. of stems**	**Weight**
Date								