

Coal Ash as a Propagation Medium

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INTRODUCTION

My nursery produces tube stock of various lines for sale in 2-in. (5 cm) tubes. The cutting medium that I had settled on before trying ash consisted of 3 parts washed river sand, 2 parts peatmoss and 1 part perlite (SPP).

As propagators, we are always trying to find ways of improving our techniques so as to obtain better results. During conversations with various propagators I became aware of the use of coal ash as a striking medium. Some of the results that these people were quoting suggested to me that some trials might prove worthwhile.

I decided to try it out by putting a very small percentage of my normal production into coal ash medium. These initial trials proved promising so in the following season I increased the percentage of cuttings in coal ash. To ensure a workable comparison, I put my programmed cutting production into the two media on an approximately 50/50 basis. Production proceeded as it normally would. No changes were made to hormone use, bottom heating, or misting settings. Accurate records of the results were kept. Some of these results are listed below (See Tables 1, 2, 3, and 4 for comparisons between coal ash and a sand, peatmoss and perlite medium).

COAL ASH

What Exactly is Coal Ash? It is the ash which is left after black coal is burnt in an industrial boiler or furnace. In other words, it is a waste product. The raw coal is crushed and graded to a small particle size (approximately 1/4 in. or 6 mm.). After burning, the ash is then removed from the boiler and cooled by spraying with water. In some cases, salt water is used to cool the ash. This product could not be used. The coal used in my area has a low phosphorus content.

Preparation for Use. The only preparation used to ready the ash for use in propagation is sieving. It has been found that 3/16- to 1/4-in. mesh (5 mm to 6 mm) is the best. In my nursery I sieve the ash through a 3/16-in. mesh builders sieve. Some soil suppliers will sieve ash before delivery when large quantities are to be supplied. Larger size mesh leaves particles which are too big and interfere with dibbling, particularly in small cell packs. All the material that falls through the sieve is used including the very fine particles. In my experience, when striking finer cuttings, such as *Coleonema*, sieving through a 3/16-in. sieve gives a better result.

Analysis. Some pH variation has been found from batch to batch of coal ash and some may need to be adjusted. This particular ash does not have excessive levels of anything that would harm plants. Other ashes must be analysed before use.

Storage. Some care should be taken to provide hygienic storage conditions for ash. As it is sterile when delivered, it could be prone to the rapid spread of fungal pathogens if stored on bare soil or left in the open. If storage in a clean undercover area is not available, re-sterilization may be needed.

Table 1. Examples where strike was better in ash than in standard mix.

Plant	Medium	No. cuttings planted	No. cuttings stuck	Strike rate (%)
<i>Callistemon viminalis</i> 'Little John'	SPP ¹	273	90	33
	ASH	273	226	83
<i>Juniperus virginiana</i> 'Skyrocket'	SPP	198	74	37
	ASH	396	226	57
	ASH	420	396	94
<i>Nerium oleander</i> "Splendens Variegatum"	SPP	40	12	30
	ASH	217	202	93
<i>Metasequoia glyptostroboides</i>	SPP	198	54	27
	ASH	228	144	63
<i>Coleonema</i> 'Rubrum'	SPP	198	6	3
	ASH	198	46	23
<i>Rosa banksiae</i>	SPP	198	56	28
	ASH	396	191	48

¹ SPP = sand, peatmoss, and perlite medium; ASH = coal ash.

Table 2. Examples where strike in ash was not better than in standard mix.

Plant	Medium	No. cuttings planted	No. cuttings stuck	Strike rate (%)
<i>Pyrostegia venusta</i>	SPP ¹	912	870	95
	ASH	131	118	90
<i>Coleonema pulchrum</i> 'Sunset Gold'	SPP	396	310	78
	ASH	792	454	57

¹ SPP = sand, peatmoss and perlite medium; ASH = coal ash.

Cost. Sand, perlite, and most particularly peatmoss are quite expensive in Australia. I also find that the sand available today is generally very dirty and much time is spent washing it prior to use. Taking this into account, the approximate cost of my usual cutting mix is about \$160.00 per cubic metre.

Table 3. Examples where cutting struck quicker in coal ash.

Plant	Difference (SPP-ASH) ¹ (days)
<i>Buxus sempervirens</i> 'Arborescens'	42
<i>Rhaphiolepis umbellata</i>	23
<i>Camellia sasanqua</i>	35

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Table 4. Examples where no marked difference was noted.

Plant	Medium	No. cuttings planted	No. cuttings stuck	Strike rate (%)
<i>Jasminum polyanthum</i>	SPP ¹	192	192	100
	ASH	3042	3008	99
<i>Nandina domestica</i> 'Nana'	SPP	560	544	97
	ASH	1480	1434	97
<i>Vinca minor</i>	SPP	396	389	98
	ASH	396	396	100
<i>Buxus microphylla</i> 'Microphylla'	SPP	198	197	99
	ASH	792	739	93
<i>Coleonema pulchrum</i> 'Compactum'	SPP	546	451	82
	ASH	273	219	80
<i>Michelia figo</i>	SPP	198	198	100
	ASH	369	354	96
<i>Murraya paniculata</i>	SPP	1840	1713	93
	ASH	860	807	94

¹ SPP = sand, peatmoss and perlite medium; ASH = coal ash.

However, in Sydney, ash costs approximately \$30.00 per cubic metre. The often faster striking rate of cuttings in ash produces additional cost reduction through more efficient use of heated bench space.

Watering Requirement During Use. The water-holding and drainage characteristics of coal ash have proven to be very good, with one of the test results I received going as far as to describe it as "a near perfect propagation mix, physically". It is very easy to wet and re-wet and its good drainage makes it ideal if inexperienced personnel are watering. I have found that basal rot of cuttings has been almost eliminated when using coal ash, whereas it can be prevalent in an overwatered sand, perlite, and peat mix.

It has been reported to me that coal ash can become quite dry without detrimental effects on the cuttings in it.

Although air filled porosity can be a bit low, I have found this to be a problem only in 273 cell packs—which has very small cells.

Root Structure. There is some difference in root structure in ash. Roots are more numerous, although shorter relative to those in my standard cutting mix. However, no discernible difference in growth was noted after potting-on.

CONCLUSION

In conclusion, I feel that coal ash is a rooting medium with a lot of promise and economic benefits. If a local supply can be found, my advice is “get some, have it tested, and try it out.”