

BIBLIOGRAPHY

MORESTO, DARWIN P. APRIL 2013. Germination and Seedling Growth of Cape Gooseberry as Affected by Different Growing Media. Benguet State University, La Trinidad Benguet.

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ABSTRACT

The study was conducted at the Pomology project, Benguet State University from October to December 2010 to determine the effects of the different growing media on the germination of Cape gooseberry seeds, and determine the best growing media that will promote and enhance seed germination and seedling growth of Cape gooseberry.

There were significant differences were observed among the different media used with the number of days to emergence, the number of days to complete seedling emergence, the percentage of germination, percentage of normal seedlings, percentage of abnormal seedling, Number of days to first appearance of leaves, seedling height at 30 days, seedling height at 60 days after emergence seedling height at transplanting, number of leaves at transplanting, number of days to readiness for transplanting and seedling vigor.

The media combination of 1:1:1:1 garden Soil: alnus compost: coco coir dust and sand enhanced faster emergence, earliest to complete seedling emergence, high percentage of germination, high percentage of normal seedlings, earliest appearance of leaves, earliest to be transplanted, and produced the most vigorous seedlings with excellent growth and dark green leaves.



RESULTS AND DISCUSSION

Number of Days to Seedling Emergence

As presented in Table 1, there were significant differences observed among the different media used on the number of days to emergence of Cape gooseberry seeds. Results showed that the seeds sown in garden soil +alnus compost+ coco coir dust +sand were the earliest to germinate with a mean of 8 days. This was followed by the seeds sown in media combination of garden soil +alnus compost +sand with a mean of 9 days which was statistically comparable also with the seeds sown garden soil+ alnus compost which was followed further by the seeds sown in garden soil + alnus compost +coco coir dust and the combination of garden soil and coco coir dust While the seeds sown in Garden soil +sand had delayed seed germination with a mean of 12 days from sowing.

Table 1. Number of days to seedling emergence

TREATMENT	MEAN (Days)
Garden soil (Control)	11 ^b
1:1 garden soil + alnus compost	9 ^d
1:1 garden soil + coco coir dust	10 ^c
1:1 garden soil + sand	12 ^a
1:1:1 garden soil + alnus compost+ coco coir dust	10 ^{bc}
1:1:1 garden soil + coco coir dust + sand	11 ^b
1:1:1 garden soil + alnus compost + sand	9 ^d
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	8 ^d

Means with the same letter are not significantly different at 5% level DMRT



Number of days to complete seedling emergence

The result in Table 2 shows that there were significant differences observed among the various media used on the number of days to complete seedling emergence. The results reveal that the seeds sown in garden soil +alnus compost +coco coir dust +sand had the earliest number of days to complete seedling emergence with a mean of 11 days but were comparable with the seeds sown in garden soil+ alnus compost. This was followed by the seed sown in garden soil +alnus compost +sand with a mean of 13 days which was statistically the same with the seeds sown in garden soil + coco coir dust+ garden soil. The seeds sown in garden soil +sand had the longest days to complete seedling emergence with a mean of 15 days.

Table 2. Number of days to complete seedling emergence

TREATMENT	MEAN (Days)
Garden soil (Control)	15 ^b
1:1 garden soil + alnus compost	11 ^e
1:1 garden soil + coco coir dust	14 ^c
1:1 garden soil + sand	16 ^a
1:1:1 garden soil + alnus compost+ coco coir dust	13 ^d
1:1:1 garden soil + coco coir dust + sand	14 ^{bc}
1:1:1 garden soil + alnus compost + sand	13 ^d
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	11 ^e

Means with the same letter are not significantly different at 5% level DMRT



Percentage Germination

Table 3 reveals that there were slight differences noted on the percentage of germination of Cape gooseberry seeds as affected by the different growing media used. The seeds sown in garden soil +alnus compost + coco coir dust +sand had the highest percentage germination with a mean of 100 % but was comparable with the seeds sown in garden soil (control), garden soil+ alnus compost and garden soil + alnus compost +sand followed by seeds sown in media combination of garden soil +coco coir dust with a mean of 95 % while it was found out that the lowest percentage of germination was obtained by the seeds sown in garden soil +sand with a mean of 82.5 %.

Table 3. Percentage germination

TREATMENT	MEAN (%)
Garden soil (Control)	100 ^a
1:1 garden soil + alnus compost	100 ^a
1:1 garden soil + coco coir dust	95 ^a
1:1 garden soil+ sand	82.5 ^b
1:1:1 garden soil + alnus compost+ coco coir dust	92.5 ^a
1:1:1 garden soil + coco coir dust + sand	95 ^a
1:1:1 garden soil + alnus compost + sand	100 ^a
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	100 ^a

Means with the same letter are not significantly different at 5% level DMRT



Percentage of Normal Seedling

With regards to the percentage of normal seedlings, there were significant differences observed as shown in table 4. The results showed that seeds sown in garden soil+ alnus compost +coco coir dust +sand attained the highest percentage of normal seedling with a mean of 100% which was comparable with the seeds sown in garden soil+ alnus compost but statistically the same with the seed sown in the combination of garden soil + alnus compost +sand, garden soil (control) and garden soil + coco coir dust followed by the seeds sown in garden soil +alnus compost+ coco coir dust; while the seeds sown in garden soil +sand had the lowest percentage of normal seedlings with a mean of 77.5 %.

Table 4. Percentage of normal seedlings

TREATMENT	MEAN (%)
Garden soil (Control)	97.5 ^a
1:1 garden soil + alnus compost	100 ^a
1:1 garden soil + coco coir dust	82.5 ^a
1:1 garden soil + sand	77.5 ^d
1:1:1 garden soil + alnus compost+ coco coir dust	90 ^b
1:1:1 garden soil + coco coir dust + sand	87.5 ^{cd}
1:1:1 garden soil + alnus compost + sand	98 ^a
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	100 ^a

Means with the same letter are not significantly different at 5% level by DMRT



Percentage of Abnormal Seedling

Table 5 shows that there were significant differences obtained on the percentage of abnormal seedling as affected by different growing media used. Results shows that seeds sown garden soil+ alnus compost +coco coir dust +sand did not result to any abnormal seedlings. It was comparable with the seeds sown in garden soil+ alnus compost. This was followed by the seeds sown garden soil +alnus compost +sand with a mean of 2.5%but was statistically the same with the seeds sown in garden soil (control) .It was followed further by the seeds sown in garden soil + coco coir dust +sand and garden soil+ coco coir dust. The seeds sown in garden soil +sand had the highest percentage of abnormal seedling with a mean of 22.5 %.

Table 5 Percentage of abnormal seedlings

TREATMENT	MEAN (%)
Garden soil (Control)	2.5 ^d
1:1 garden soil + alnus compost	0 ^d
1:1 garden soil + coco coir dust	15 ^{ab}
1:1 garden soil + sand	22.5 ^a
1:1:1 garden soil + alnus compost+ coco coir dust	10 ^c
1:1:1 garden soil + coco coir dust + sand	12.5 ^{bc}
1:1:1 garden soil + alnus compost + sand	2.5 ^d
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	0 ^d

Means with the same letter are not significantly different at 5% level by DMRT



Number of Days to First appearance of Leaves

As presented in table 6, there were only slight differences observed among the different media used in the study. Results showed that the seeds sown in a media composition using garden soil +alnus compost +coco coir dust +sand had the shortest number of days to first appearance of leaves with a mean of 11 days which is was comparable to the seeds sown using garden soil + alnus compost. This was followed by the seeds sown in garden soil+ alnus compost + sand as well as those sown in garden soil + alnus compost+ coco coir dust. The seeds sown using garden soil + sand had significantly delayed first appearance of leaves.

Table 6. Number of days to first appearance of leaves

TREATMENT	MEAN (Days)
Garden soil (Control)	14.75 ^b
1:1 garden soil + alnus compost	11.5 ^{ef}
1:1 garden soil + coco coir dust	13.25 ^c
1:1 garden soil + sand	16.25 ^a
1:1:1 garden soil + alnus compost+ coco coir dust	12.25 ^{cd}
1:1:1 garden soil + coco coir dust + sand	14.25 ^b
1:1:1 garden soil + alnus compost + sand	12.25 ^{ed}
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	11 ^f

Means with the same letter are not significantly different at 5% level by DMRT



Seedling Height at 30 Days After Emergence

Table 7 reveals that there were significant differences on the seedling height at 30 days after seed germination of Cape gooseberry. The result showed that seeds sown in gardensoil +alnus compost + coco coir dust + sand were the tallest seedlings with a mean of 5.05 cm in height followed by the seeds sown in media composition of garden soil + alnus compost with a mean of 4.90 cm in height It was further followed by the seeds sown in garden soil +alnus compost, garden soil +alnus compost + sand, garden soil + coco coir dust and garden soil+ coco coir dust + sand. The seeds sown in garden soil + sand were the shortest among the treatments with a mean of only 4.57 cm in height at 30 days after seedling emergence. Seedling, at 30 days at planting is shown in Figure 4.

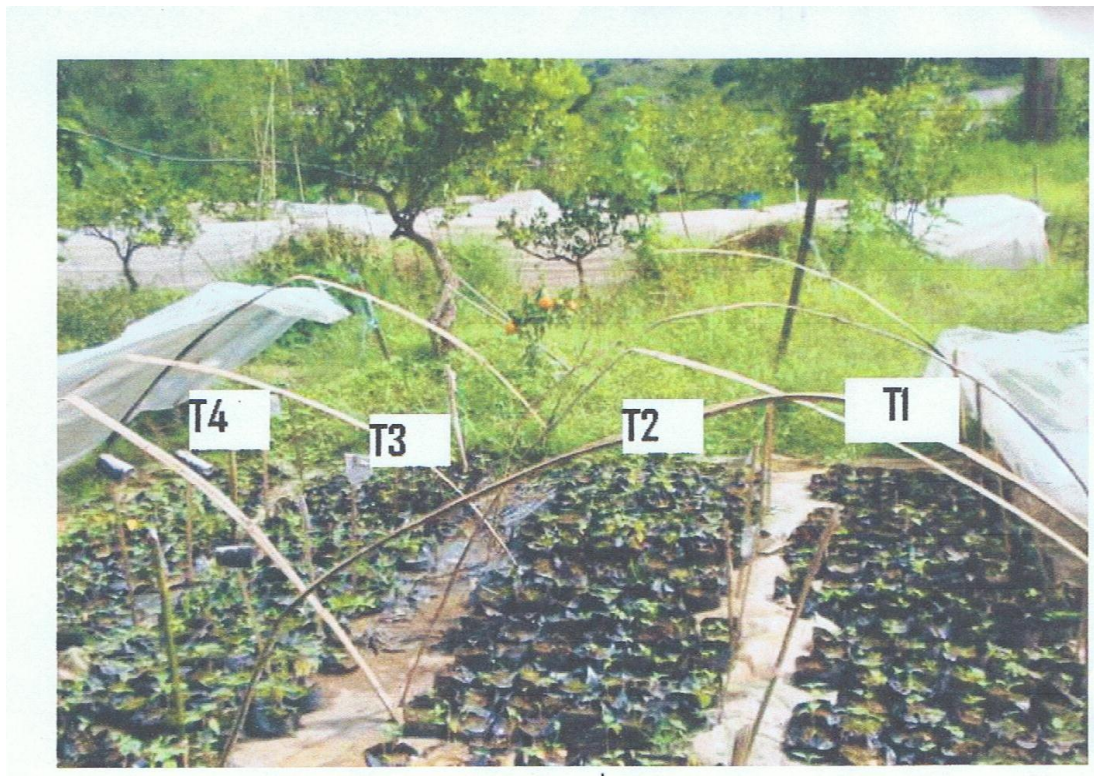


Figure 3. Seedling at 30 days after seed emergence.

Table 7.1 Seedling height at 30 days after emergence

TREATMENT	SEEDLING HEIGHT AT 30 DAYS AFTER EMERGENCE
Garden soil (Control)	4.63 ^{de}
1:1 garden soil + alnus compost	4.90 ^b
1:1 garden soil + coco coir dust	4.90 ^b
1:1 garden soil + sand	4.73 ^d
1:1:1 garden soil + alnus compost + coco coir dust	4.57 ^e
1:1:1 garden soil + coco coir dust + sand	4.70 ^d
1:1:1 garden soil + alnus compost + sand	4.65 ^d
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	4.81 ^c

Means with the same letter are not significantly different at 5% level by DMRT

Seedling Height at 60 Days After Seed Emergence

Table 7.2 reveals that there were highly significant differences in the seedling height at 60 days after seedling emergence. The results showed that the seeds sown in garden soil + alnus compost + coco coir dust + sand produced the tallest seedling as influenced by the media used with a mean of 8.77cm in height followed by the seed sown in garden soil + alnus compost with a mean of 8.72 cm. The seeds sown in garden soil + alnus compost + sand also followed as well as the seed sown using garden soil + alnus compost + coco coir dust were statistically comparable to the seedling height of seed sown in garden soil + coco coir dust. The shortest seedlings at 60 days after emergence were noted on the seedlings with garden soil + sand as the growing media.



The shortest seedling height with a mean of 8.50 cm was obtained from the plants grown in garden soil +sand.



Figure 4. Seedling height at 60 days after seedling emergence

Table 7.2 Seedling height at 60 days after emergence

TREATMENT	SEEDLING HEIGHT AT 60 DAYS AFTER EMERGENCE
Garden soil (Control)	8.57 ^e
1:1 garden soil + alnus compost	8.72 ^b
1:1 garden soil + coco coir dust	8.60 ^{cd}
1:1 garden soil + sand	8.50 ^f
1:1:1 garden soil + alnus compost + coco coir dust	8.62 ^{cd}
1:1:1 garden soil + coco coir dust + sand	8.58 ^{de}
1:1:1 garden soil + alnus compost + sand	8.64 ^c
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	8.77 ^a

Means with the same letter are not significantly different at 5% level by DMRT

Seedling Height at Transplanting (cm)

Table 8 shows that there were significant differences observed among the various media used in the study affecting the seedling height at transplanting. The results show that the seeds sown in garden soil +alnus compost +coco coir dust + sand attained the tallest height with a mean of 9.30 cm height followed by the seeds sown in garden soil + alnus compost with a mean of 9.25 cm in height as well as the seeds sown in garden soil +alnus compost+ sand and garden soil +alnus compost but statistically comparable to the rest of the treatment. Height at transplanting is shown in Figure 5

Table 8. Seedling height at transplanting (cm)

TREATMENT	MEAN
Garden soil (Control)	8.95 ^d
1:1 garden soil + alnus compost	9.25 ^b
1:1 garden soil + coco coir dust	8.97 ^d
1:1 garden soil + sand	8.93 ^d
1:1:1 garden soil + alnus compost+ coco coir dust	8.96 ^d
1:1:1 garden soil + coco coir dust + sand	8.96 ^d
1:1:1 garden soil + alnus compost + sand	9.12 ^c
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	9.30 ^a

Means with the same letter are not significantly different at 5% level by DMRT





Figure 5. Seedling at transplanting

Number of Leaves at Transplanting

With regards to the number of leaves at transplanting, there were significant differences Observed as shown in Table 9. The results show that the seeds sown using garden soil+ alnus compost + coco coir dust+ sand had the highest number of leaves with a mean of 10.25 which was comparable with the seeds sown in garden soil + alnus compost +sand and garden soil+ alnus compost. Following are the seeds sown in garden soil + alnus compost+ coco coir dust, garden soil + coco coir dust and garden soil+ coco coir dust+ sand. The least number of leaves at transplanting were noted on the media combination of garden soil+ sand.

Table 9. Number of leaves at transplanting

TREATMENT	MEAN
Garden soil (Control)	8.25 ^{bc}
1:1 garden soil + alnus compost	9.75 ^a
1:1 garden soil + coco coir dust	8.25 ^{bc}
1:1 garden soil + sand	7.25 ^c
1:1:1 garden soil + alnus compost+ coco coir dust	8.5 ^b
1:1:1 garden soil + coco coir dust + sand	7.75 ^{bc}
1:1:1 garden soil + alnus compost + sand	10.25 ^a
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	10.25 ^a

Means with the same letter are not significantly different at 5% level by DMRT

Number of days to readiness to transplant

As presented in Table 10, there were significant differences observed among the media used in the study affecting the number of days to readiness to transplant. Results showed that the seeds sown in garden soil+ alnus compost + coco coir dust + sand had the shortest number of days to transplanting with a mean of 73 days followed by the seeds sown in garden soil +alnus compost +sand and garden soil + alnus compost with mean of 78 days followed further by the seeds sown in garden soil + alnus compost + coco coir dust while the seeds sown in garden soil +sand attained the highest number of days to transplanting time with a mean of 85 days.



Table 10. Number of days to readiness for transplanting

TREATMENT	MEAN (Days)
Garden soil (Control)	83 ^{ab}
1:1 garden soil + alnus compost	78 ^d
1:1 garden soil + coco coir dust	81 ^{bc}
1:1 garden soil + sand	85 ^a
1:1:1 garden soil + alnus compost+ coco coir dust	80 ^{cd}
1:1:1 garden soil + coco coir dust + sand	83 ^{ab}
1:1:1 garden soil + alnus compost + sand	78 ^d
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	73 ^e

Means with the same letter are not significantly different at 5% level by DMRT

Seedling Vigor

Table 11 shows that there were significant differences among the media used in the seedling vigor of Cape gooseberry seedlings. The results revealed that the seeds sown in garden soil + alnus compost +coco coir dust + sand attained the most vigorous seedlings with a mean of 4 most vigorous excellent growths with dark green leaves which is comparable with seeds sown garden soil +alnus compost+ sand and garden soil +alnus compost, garden soil + coco coir dust and garden soil+ alnus compost + coco coir dust while seeds sown in garden soil +sand attained the lowest rating with a mean of 2.75 which is less vigorous and with yellow leaves.



Table 11. Seedling vigor

TREATMENT	MEAN (Rating)
Garden soil (Control)	3.25 ^{ab}
1:1 garden soil + alnus compost	4 ^a
1:1 garden soil + coco coir dust	3.5 ^{ab}
1:1 garden soil + sand	2.75 ^c
1:1:1 garden soil + alnus compost+ coco coir dust	3.5 ^{ab}
1:1:1 garden soil + coco coir dust + sand	3.25 ^{bc}
1:1:1 garden soil + alnus compost + sand	4 ^a
1:1:1:1 garden soil + alnus compost + coco coir dust + sand	4 ^a

Means with the same letter are not significantly different at 5% level by DMRT

<u>Rating</u>	<u>Description</u>
4	Most vigorous - excellent growth with dark green leaves.
3	Vigorous - good growth with green leaves.
2	Less vigorous - poor growth with yellow leaves.
1	Poor – poor growth with yellow leaves



SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at the Pomology project, Benguet State University from the month of October to December 2010 to determine the effects of the different growing media on the seed germination of Cape gooseberry seed, as well determine the best growing media that will promote and enhance seed germination and seedling growth of Cape gooseberry.

There were only slight significant differences observe with regards percentage of germination, number of days to first appearance of leaves seedling height at 30 days after seed emergence and seedling height at 60 days However significant differences were observed on the number of days of emergence, number of days to complete seedling emergence, percentage of normal seedlings percentage of abnormal seedlings, Seedling height at transplanting, number of leaves at transplanting, number of days to readiness for transplanting and seedling vigor.

The media combination of 1:1:1:1 garden soil +alnut compost +coco coir dust +sand enhanced faster to emergence , shortest number of days to complete seedling emergence, high percentage, of germination, high percentage of normal seedlings, first appearance of leaves, shortest days to transplant, and produced the most vigorous seedlings with excellent growth and dark green leaves.



Conclusion

Based from the results, the media combination of 1:1:1:1 garden soil +alnut compost +coco coir dust +sand is the best growing media in sowing Cape gooseberry seeds as it enhanced faster to emergence, shortest number of days to complete seedling emergence, high percentage of germination, high percentage of normal seedlings, first appearance of leaves, shortest days to transplant, and produced the most vigorous seedlings with excellent growth and dark green leaves.

Recommendation

From the preceding results and discussions, the combination of garden soil +alnut compost +coco coir dust +sand is recommended as the appropriate growing media in germinating Cape gooseberry as it was observed to have influenced the production of seedling with observable characteristics.



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