

CORRESPONDENCE

to the papaya industry. Attempts have been made in this direction in other papaya-growing countries such as South Africa, Brazil and USA. The effect of grafting on the fruiting of TaiNung No. 2 and TaiNung No. 5 papaya varieties revealed that grafted plants are shorter than the ungrafted seedlings; they did not show incompatibility between scion and rootstock and yielded better than ungrafted papaya trees⁸. In India, the cleft graft combination of Co. 2/9-1(D) performed during January, registered the maximum survival percentage under Coimbatore conditions⁹.

Thus by vegetative propagation, there is a possibility of maintaining the original characteristics of the parent plant apart from several advantages such as higher yield, lower fruiting height,

longer cropping span. The technique would be a great boon in papaya production especially the dioecious types.

1. <http://www.acgssr.org/BioTechnology/V2N2December1999/fullpaper/p.22.pdf>
2. Villegas, V. N. *et al.*, In Annual Scientific Conference, Philippines, Baguio City, 1997.
3. Nhat Hang, N. T. and Chau, N. M., 2000; www.sofri.ac.vn/english/research_program/2000/trangnguyen.pdf
4. Allan, P., *Acta Hort.*, 2007, **740**, 217–223.
5. Chong, S. T. *et al.*, *Acta Hort.*, 2007, **787**, 273–276.
6. Chong, S. T. *et al.*, In First International Symposium on Papaya, Genting Highlands, 2005, pp. 22–24.
7. Allan, P. *et al.*, *Acta Hort.*, 2010, **851**, 253–258.

8. Weng, S. W. and Yang, Y. S., 1999; <http://ir.lib.nchu.edu.tw/handle/309270000/30125>
9. Senthilkumar, S., PG dissertation submitted to TNAU, Coimbatore, India, 2011.

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CO₂ levels and coral reefs

Existing atmospheric carbon dioxide (CO₂) concentration at 400 ppm is worrisome¹. One major reason for this is, dwindling CO₂ sinks. We are losing our natural capital, e.g. one of the available CO₂ sinks – coral reef – ‘the underwater forests’ which provide us the services by burial of CO₂ in their skeletons along with their photosynthetic symbiotic inhabitants (zooxanthellae). They play a significant role within an ocean ecosystem by providing food and habitat for 550,000 to 1,330,000 species². This highlights the indirect but crucial contribution of corals in sequestering atmospheric carbon because oceans sequester 20–35% of anthropogenic CO₂ emissions³. It has been reported that coral reefs confer 7–15% of global calcium carbonate production, leading to carbon sequestration⁴. Corals carry a great socio-economic potential and bestow human life with valuable goods and services which accounts to an estimated value of over \$31 billion (US\$, 2014) annually, for all reefs combined. They support tourism through their aesthetic value, have biomedical uses, provide coastal protection and other industrially valuable compounds. But we as a human race ignored this natural wealth and eco-

logical infrastructure and have driven this marine wealth to depletion through our devastating actions. Warm water, destructive fishing practices, ocean acidification coupled with other factors led to massive destruction of corals⁵. This is evident from the adverse effects on the Great Barrier Reef, which in the recent years (1985–2012) has resulted in 50.7% of decline in the initial coral cover⁶; this will surely affect the whole ecosystem and the CO₂ balance thereby. However exact increase of CO₂ levels is not reported. Let us understand and manage our actions to save this iconic underwater property. Initiatives for their protection and prevention are however being taken by various government organizations but it is every individual’s responsibility to halt the anthropogenic damage to their fragile environment. Recently, a coral bleaching index was reported; designed for the purpose of standardizing and comparing the susceptibility of coral reefs to thermal bleaching⁷. Even some models are being applied for the evaluation of coral reef ecosystems to review diverse environmental effects on them⁸. Hopefully, these initiatives to preserve coral reefs will be a step to level off or may be to decrease the existing levels of CO₂.

1. Monastersky, R., *Nature*, 2013, **497**, 13–14.
2. Wear, S. L. and Thurber, R. V., *Ann. N.Y. Acad. Sci.*, 2015, **1355**, 15–30.
3. Khatiwala, S., Primeau, F. and Hall, T., *Nature*, 2009, **462**, 346–349.
4. Zarate-Barrera, T. G. and Maldonado, J. H., *PLoS ONE*, 2015, **10**, e0126627.
5. Ganguly, S., *Int. J. Pure Appl. Biosci.*, 2016, **4**, 166–167.
6. De’ath, G., Fabricius, K. E., Sweatman, H. and Puotinen, M., *Proc. Natl. Acad. Sci.*, 2012, **109**, 17995–17999.
7. Swain, T. D. *et al.*, *Global Change Biol.*, 2016, **22**, 2475–2488.
8. Weijerman, M., Fulton, E. A. and Brainard, R. E., *PLoS ONE*, 2016, **11**, e0152577.

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