Table 1. Platinum group elements and gold values analysed by fire assay cum ICP–AES method

Sample no.	Platinum (ppb)	Palladium (ppb)	Gold	Sample description	Latitude : Longitude
AMB–1	< 5	< 5	< 50 ppb	Muscovite–biotite schist	24°34′55″ : 72°84′59″
AMB–2	< 5	35	< 50 ppb	Quartz–sericite schist	
AMB–3	< 5	< 5	1 ppm	Sulphide ores	24°34′53″ : 72°84′49″
AMB–4	< 5	< 5	750 ppb	Quartz–sericite schist	24°34′55″ : 72°84′52″
AMB–5	< 5	< 5	50 ppb	Phyllite	
AMB–6	< 5	< 5	60 ppb	Quartz–sericite schist	
AMB–7	< 5	< 5	1.95 ppm	Amphibolite	24°34′50″ : 72°84′49″
AMB–8	< 5	< 5	50 ppb	Phylite–chlorite schist	24°34′53″ : 72°84′69″
AMB–9	< 5	< 5	< 50 ppb	Talc–tremolite schist	

Laboratory, Geological Survey of India, Kolkata. The analytical results are presented in Table 1.

These results reveal that out of nine samples, three show values of 1.95 ppm, 1 ppm and 750 ppb for gold, while the platinum and palladium values are below detection limit. The dissemination of galena has also been reported in amphibolite of the Ambaji mine sequence (Golani, P. R., 2010 unpublished). In view of the occurrence of gold mineralization with VMS type Cu–Zn sulphide at Danva in Sirohi District, Rajasthan[6], the present report of gold mineralization calls for detailed sampling, and ore petrographic and geochemical studies for understanding the mode of occurrence and environment of deposition of gold in sulphide ores.

1. Heron, A. M., *Geol. Soc. India, Mem.*, 1953, **79**, 389.
2. Bhattacharjee, J., Golani, P. R. and Reddy, A. B., *Indian J. Geol.*, 1988, **60**, 191–199.
3. Choudhary, A. K., Gopalan, K. and Sastry, C. A., *Tectonophysics*, 1984, **105**, 131–140.
4. Golani, P. R., Reddy, A. B., Bhattacharjee, J. and Mathur, K. N., *Spec. Publ. Geol. Surv. India*, 2004, **72**, 1–12.
5. Deb, M., *Econ. Geol.*, 1980, **75**, 572–591.
6. Bhattacharjee, J., Ramji Reddy, A. B. and Golani, P. R., *Indian Minerals*, 1991, **45**, 183–188.

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S. N. BHAGAT

Geological Survey of India,
DG's Camp Office, A-2 Pushpa Bhawan,
Madangir Road,
New Delhi 110 062, India
e-mail: snbhagat2004@yahoo.co.in

Tricotyledony in critically endangered plant, *Ceropegia mahabalei* Hemadri et Ansari (Apocynaceae)

The presence of two cotyledons is the characteristic feature of dicotyledons, but sometimes additionally one cotyledon can be produced. The origin of tricotyledonous seedling may be due to genetic variability and is referred to as tricotyledony or tricotyly. Occurrence of tricotyledony was reported in a few tree species, viz. *Acacia mellifera* (Vahl) Benth.[1], *Butea monosperma* (Lam.) Taub.[2] and *Emblica officinalis* Gaertn.[3]. This phenomenon was also reported in shrubs like *Hippophae rhamnoides* L.[4] and *Withania somnifera* (L.) Dunal[5]. Here we deal with tricotyledony observed during the seed germination experiment for *in vitro* micropropagation of the critically endangered tuberous plant *Ceropegia mahabalei* Hemadri et Ansari.

C. mahabalei Hemadri et Ansari (Apocynaceae), locally known as 'Gauti Kharpudi', is endemic to the Western Ghats of Maharashtra[6]. Tubers of this plant are rich in carbohydrates and are consumed by the local people. This species is so far known only from its type locality, i.e. Ralegaon Hills about 10 km west of Junnar, Pune District, Maharashtra[6]. The species grows on exposed slopes of the hills among grasses at an altitude between 1000 and 1100 m. It has been included in the *Red Data Book*[7], been treated as Critically Endangered[6] and has been included in the IUCN Red list[8]. IUCN has also recommended large-scale *in vitro* propagation for conservation of this plant species[8].

Follicles of this species were collected in December 2010 from natural population at Ralegaon Hills. For germination studies, the follicles were cut longitudinally along their sutures to obtain the seeds. Seeds were first washed with running tap water for 10 min and then soaked in Tween-20 solution (2–4% v/v) for 2–5 min. Thereafter, the seeds were washed twice with distilled water and surface-sterilized with 0.1% (w/v) freshly prepared aqueous mercuric chloride for 5 min. Finally, these seeds were washed thrice with sterile distilled water

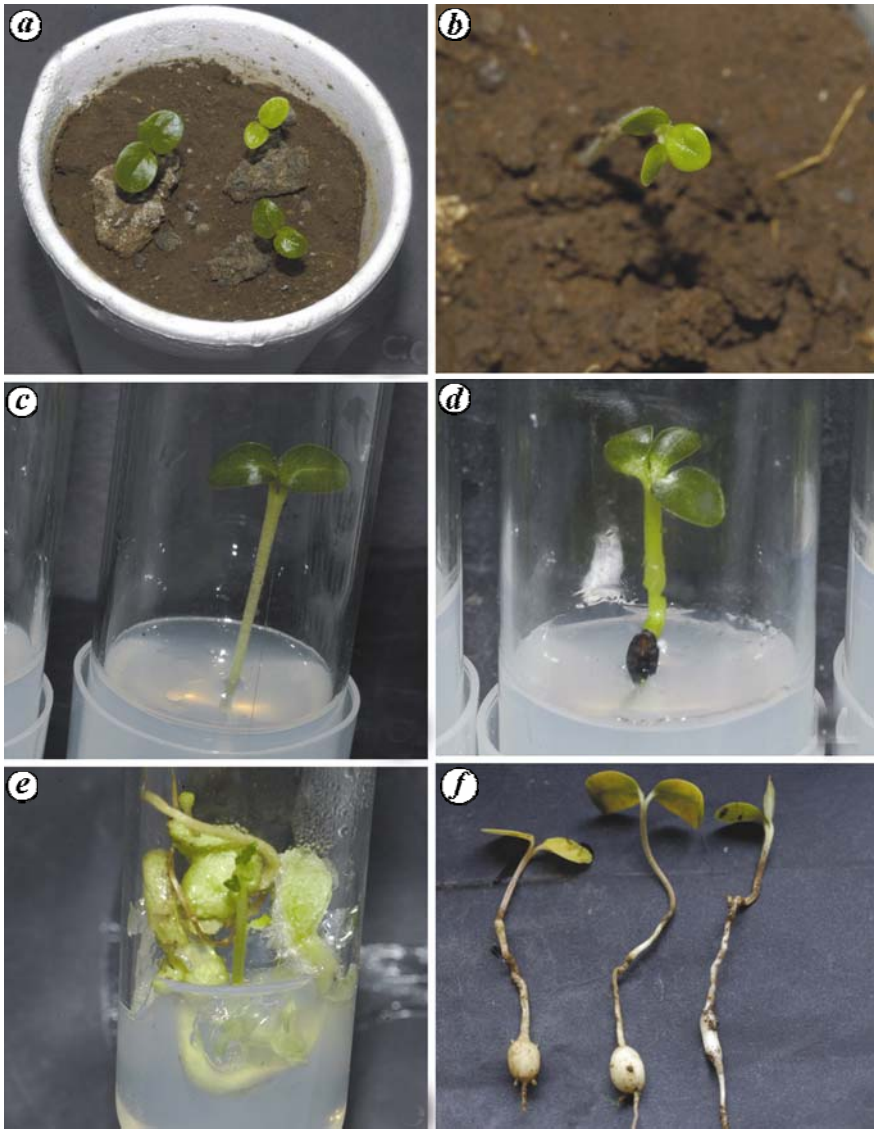

Figure 1. *Ceropegia mahabalei* Hemadri et Ansari. Seed germinated in soil: dicotyledonous (***a***) and tricotyledonous (***b***). Seed germinated in basal MS medium: dicotyledonous (***c***) and tricotyledonous (***d***). (***e***) Development of shoot on root in basal MS medium. (***f***) Tuber formation in seedlings when germinated in soil.

and inoculated on MS basal medium under laminar air flow[9]. After 10 days, observations were made to note the seed germination. Within a week after germination, about 4% of the seeds developed tricotyledonous seedlings (Figure 1 *b*). Seeds directly germinated in soil also showed development of tricotyledonous seedlings (Figure 1 *d*). It was also observed that the plants germinated *in vitro* from the seeds showed development of roots, which further gave rise to shoot (Figure 1 *e*). *In vivo* germinated seeds showed the development of a small tuber (Figure 1 *f*). In the field, after seed germination during monsoon and development of the tuber, the tuber remained below the ground. The cotyledonary leaves were shed at the end of the monsoon. The tuber remained dormant till the next monsoon and then it developed into a new plant.

1. Kesari, N., Reddy, Ch. S. and Bhanja, M. R., *Indian J. For.*, 2000, **23**, 440–441.
2. Purohit, M. and Jamaluddin, *Indian For.*, 1988, **114**, 238.
3. Pushpkar, B. P. and Babely, G. S., *Indian For.*, 1990, **116**, 597.
4. Korekar, G., Singh, H., Shrivastava, R., and Stobdan, T., *Curr. Sci.*, 2012, **102**, 159–160.
5. Reddy, C. S., Nagesh, K. and Rao, P. S., *J. Non-Timber For. Prod.*, 2001, **8**, 100.
6. Mishra, D. K. and Singh, N. P., *Endemic and Threatened Flowering Plants of Maharashtra*, Botanical Survey of India, Kolkata, 2001, pp. 139–141.
7. Nayar, M. P. and Sastry, A. R. K., *Red Data Book of Indian Plants*, Botanical Survey of India, Kolkata, 1987, vol. 1, p. 170.
8. Walter, K. S. and Gillet, H. J., IUCN Red list of threatened plants, Species Survival Commission. IUCN, Switzerland and Cambridge, UK, 1998, p. 64.
9. Murashige, T. and Skoog, F., *Physiol. Plant.*, 1962, **15**, 473–497.

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BHARATI P. RAJPUT
VINAYA S. GHATE
ANURADHA S. UPADHYE*
MANDAR N. DATAR

Plant Science Division,
Agharkar Research Institute,
G. G. Agarkar Road,
Pune 411 004, India
**For correspondence.*
e-mail: upadhye.anuradha@gmail.com