all these techniques in the public domain, it is not the inventive step which limits the production of more transgenic varieties at present; it is the large costs involved in creating the necessary laboratory infrastructure and in assembling the trained scientific manpower. In other words, investments rather than inventiveness need to be protected.

The existing legislation on plant breeders' rights already provides an example of the kind of protection that can be extended to transgenic varieties. In the case of plant breeders' rights, the breeder is not required to provide proof of non-obviousness. For transgenic varieties also, non-obviousness has become irrelevant because of rapid advances in the recombinant DNA and transformation technologies. Transgenic varieties can be considered novel in the sense that they contain a small DNA sequence in an 'unnatural' place. But then, DNA is not species-specific. It is only the different gene combinations which become isolated in different species in the course of natural selection. Also, we have learnt in recent years that DNA observes few rules. It seems to multiply without apparent reason giving rise to a large amount of non-coding sequences, it can jump in and out of chromosomes[9], and it has coding and non-coding sequences in the same gene. Some authors have called it selfish[10]. If we can now move it around, it is only an indication of our improved understanding of its nature—an understanding to which many scientists in the past forty years have contributed.

Also, it does not seem right that intellectual property protection in the form of patents should be granted to transgenic varieties, specially when the biotechnologist has free access to improved varieties produced through classical breeding. Most developing countries do not have legislation on plant breeders' rights at present and they make their improved varieties freely available to scientists all over the world. Also, the International Agricultural Research Centres of the CG system, which have been set up to provide support to the agriculture of the developing countries working in close collaboration with their research institutions, freely distribute their improved genetic material to scientists both in the public and the private sector in the developing and developed countries. The transgenic varieties derive their yield potential and most other desirable attributes from the parental variety developed by the classical breeder. Further, most plant genetic resources which are the starting point of all varietal improvement programmes—classical or molecular—are a product of generations of selection by farmers. It is they who are selected for such traits as adaptibility to stress environments, disease and pest resistance, acceptable grain quality and yielding ability under traditional systems of agronomic management.

If transgenic varieties continue to be granted patents, many developing countries will have to take recourse to legislation on plant breeders' rights. A recent amendment of the international convention for the protection of new varieties (UPOV convention) lays down that a biotechnologist who adds limited genetic information into a variety protected by plant breeders' rights will have to obtain the original breeder's permission before using it in a transformation programme.

1. Anderson, C., *Nature*, 1992, **359**, 263.
2. Barton, J. H., *Sci. Am.*, 1991, **264**(3), 40–46.
3. Demarly, Y., in *Plant Biotechnologies for Developing Countries*, (ed. Sasson, A. and Costarini, V.), The Trinity Press, U.K., 1989, pp. 47–58.
4. Rickwood, D. and Homes, B. D., *Gel Electrophoresis of Nucleic Acids*, IRL Press, Oxford, Washington, 1982, pp. 260.
5. Higuchi, R., Dollinger, C., Walsh, P. S. and Griffth, R., *Biotechnology*, 1992, **10**, 413–417.
6. Hames, B. D. and Higgins, S. J., *Transcription and Translation*, IRL Press, Oxford, Washington, 1984, pp. 346.
7. Deblaere, R. *et al.*, *Methods Enzymol.*, 1987, **153**, 272–293.
8. Barry, T., Powell, R. and Cannon, F., *Biotechnology*, 1990, **8**, 233–236.
9. Campbell, A., *Symp. Quant Biol.*, 1980, **45**, 1–9.
10. Orgel, L. E. and Crick, F. H. C., *Nature*, 1980, **284**, 604.

Acknowledgement. I thank Dr Sushil Kumar for his comments on the manuscript.

H. K. JAIN

National Institute of Science, Technology and Development Studies, New Delhi 110 012, India

SCIENTIFIC CORRESPONDENCE

Magnesium level

Apropos the article on the reciprocal relationship between magnesium and cerium as a common basis for coconut root (wilt) disease and a human cardiomyopathy (by Valiathan *et al.*[1]), it is seen that Mg level has been presented as $\mu g\ g^{-1}$ wet weight in this article. It is customary to present mineral concentration in plant tissues on dry weight basis, as it is the most accurate and dependable method. By taking the dry weight/wet weight ratio of the middle leaf of palm as 0.39 in diseased and 0.44 in healthy plasm (Chacko Mathew, *J. of Plantation Crops*, 1981, **9**, 51–55) and converting the values as percentage on dry matter, the figures of Valiathan *et al.* become 0.065% in diseased palms, 0.059% in healthy-looking palms in Quilon and Alleppey, 0.077% in Bombay and 0.086% in Manavalakurichy, which are exceedingly low, and with such low levels, the palms would show acute Mg deficiency symptoms like severe yellowing of foliage. The critical level of Mg (frond 14) is 0.2% on dry matter basis. The magnesium contents of healthy plantations in most of the coconut-growing countries of the world range from 0.2 to 0.4% of dry matter (Manciot *et al.*, *Oleagineux*, 1979, **34**, (12), 576–580). Based on such a data the different situations were qualified as deficient or sufficient with respect to magnesium and the authors ventured to justify that the 'palms in the affected areas are either diseased or potentially diseased'. I feel that the data are too meagre for publication in your esteemed journal.

1 Valiathan, M S. Eapen, J T and Mathews, C. K., *Curr Sci*, 1992, 63, 565-567

M. K. NAIR

Central Plantation Crops Research Institute
Kasaragod 671 124, India

M. S. Valiathan and J. T. Eapen reply:

1. While elemental concentration is more often reported on dry weight basis, expression in wet weight continues to remain in vogue (ref. 1). In fact, the measurements are being made on dry weight in our ongoing studies on the possible role of metal ions in the pathogenesis of the disease.
2. The values in dry weight of magnesium which Nair had worked out from our data in wet weight, despite the marked reduction in absolute quantities which is intriguing, confirm our observation that the magnesium level in the leaves of diseased palms is lower than that in the leaves from the healthy palms of Manavalakurichi. Nor do the dry weight values of magnesium negate in any manner the reciprocal relationship between magnesium and cerium which was the central theme in our paper.
3. In determining whether a particular relationship exists between two groups, the size of the sample should be such as to enable one to draw statistically valid conclusions and rule out chance associations. Beyond this, the large size of a sample *per se* does little to strengthen a new observation. In the paper which Nair relied upon for the conversion of wet weight to dry weight, for example, the sample size was only 20 palms.

1. Environmental Health criteria 81 Vanadium, World Health Organisation, Geneva, 1988.

M. S. VALIATHAN
J. T. EAPEN

Sree Chitra Tirunal Institute for Medical Sciences and Technology
Thiruvananthapuram 695 011, India

Cytoplasmic inheritance of tolerance to insects pests in rice

Brown plant hopper (BPH) has become major constraint in rice production in several countries and biotypes have been recorded long back. Rice varieties/types, viz. Babawee, Rathu- heenati, ASD-7, Mudgo, Manoharsali, PTB-33, ARC 6650 and ARC 5984 have been utilized as resistant donors, to incorporate resistance to plant hoppers in high-yielding varieties. Sona$_{♀}$ × Manoharsali$_{♂}$ crosses yielded strains, moderately resistant to BPH. But, the progenies derived from crosses between multiple resistant cultures, viz. ARC 6650 and ARC 5984 used as female parents and MTU 4569 (Mashuri$_{♀}$ × Vijaya$_{♂}$) as male, genetically inherited yield components from male parent, while retaining the tolerance of ARC 6650/ARC 5984 for BPH. The varieties selected from these crosses, viz., MTU 4870, MTU 5182, MTU 5249, MTU 5293, MTU 5194, MTU 5195, MTU 5196 (ARC 6650$_{♀}$ × MTU 4569$_{♂}$) and MTU 2067, MTU 2077 (ARC 5984$_{♀}$ × MTU 4569$_{♂}$), are now spread over lakhs of hectares. These cultures, besides supporting/withstanding high populations of BPH (upto 500 numbers/clump), are capable of producing grain yield of 6–8 tonnes, while susceptible high yielding varieties like Mashuri and Swarna succumbed totally to BPH at about 1/10 of its intensity maintained on these tolerant lines. If these stress tolerant characteristics were genetically inherited, the donor as male should have imparted the traits through its haploid gamete. But the inheritance of tolerance in the progeny, only when the donor is female, speaks of inheritance to be from non-nuclear genome. It is indicative of high resourcefulness of cytoplasm in stress tolerant varieties.

Received 22 March 1991; revised accepted 6 January 1993

V. L. V. PRASADA RAO

Regional Agricultural Research Station, Anakapalle 531 001, India

Pleurotus djamor—A new edible mushroom

During a survey on the mushroom flora conducted on October 1991, *Pleurotus djamor* (Fr.) Boedijn was collected and is being reported for the first time from India. The sporophores of *P. djamor* appeared pure white, growing solitary or in groups on oilpalm bunch wastes dumped in the vicinity of India Oilpalm Ltd., Anchal, Quilon.

The fungus was isolated and grain spawn[1] was prepared. The mushroom was successfully cultivated (Figure 1) on sterilized water-soaked paddy straw in poly-bags[2] (45 × 30 cm) at room temperature (30 to 32°C) and RH of 70 to 90%. With 150 g spawn and 2.5 kg of sterilized water-soaked straw, an average yield of 399 g per bed was obtained, the biological efficiency being 80 per cent.

Figure 1. *Pleurotus djamor.*