

Murashige T. Plant propagation through tissue cultures.

Annu. Rev. Plant Physiol. 25:135-66, 1974.

[Department of Plant Sciences, University of California, Riverside, CA]

The article reviews the state of the art and proposes guidelines for general usage of plant tissue cultures in rapid clonal propagation. The basic stages through which the propagation must proceed and their objectives and specific requirements are identified. Three morphogenetic processes are recognized in propagule multiplication: axillary branching, adventitious shoot formation, and asexual embryogenesis. An extensive list of species that are propagable or regenerable *in vitro*, together with appropriate explants and methods of propagule increase, is included. [The SCI® indicates that this paper has been cited in over 345 publications since 1974.]

Toshio Murashige
Department of Botany
and Plant Sciences
Citrus Research Center and
Agricultural Experiment Station
College of Natural
and Agricultural Sciences
University of California
Riverside, CA 92521

September 6, 1985

Although not historically the first on the subject, this article provided the basis for plant propagation through tissue cultures. Its

guidelines and concepts have tested well in subsequent research and commercial application. The article's greatest credibility stems, perhaps, from the commercial successes. To researchers, the table of propagable species serves as a convenient initial reference. The guidelines, concepts, and species list have since been extended.¹⁻³ The current glamour of plant tissue culture as an agricultural research tool, enhanced by an identification with biotechnology, attracts many readers to reviews of the subject. My long involvement in plant tissue culture and an earlier popular article⁴ also helped in gaining readership for this paper.

Plant propagation through tissue culture is another example of science benefiting agriculture. The article, written by invitation, is an assimilation of literature data and my thoughts and experience. To know that the effort has helped others is very rewarding. I am reminded of the contributions by many students and colleagues. Most of all, I thank Walt Reuther, who more than 20 years ago foresaw this day in agriculture for plant tissue culture. He hired me then, from botany and into horticulture, and nurtured me through my fledgling years.

1. **Murashige T.** Clonal crops through tissue culture. (Barz W, Reinhard E & Zenk M H, eds.) *Plant tissue culture and its biotechnological application*. Berlin: Springer-Verlag, 1977. p. 392-403.
2. -----, Principles of rapid propagation. (Hughes K W, Henke R & Constantin M, eds.) *Propagation of higher plants through tissue culture*. Oak Ridge, TN: Technical Information Center, US Department of Energy, 1979. p. 14-24.
3. -----, The impact of plant tissue culture on agriculture. (Thorpe T A, ed.) *Frontiers of plant tissue culture 1978*. Calgary: International Association for Plant Tissue Culture, 1978. p. 15-26; 518-24.
4. **Murashige T & Skoog F.** A revised medium for rapid growth and bioassays with tobacco tissue cultures. *Physiol. Plant.* 15:473-97, 1962. [See also: **Murashige T.** Citation Classic. *Current Contents* (43):10: 23 October 1978.]