

DAFTAR PUSTAKA

- Aak. 1990. *Budidaya Tanaman Padi*. Kanisius: Yogyakarta. Hal: 172.
- Abidin, Z. 1994. *Dasar-Dasar Pengetahuan Tentang Zat Pengatur Tumbuh*. Penerbit Angkasa. Bandung. Hal: 37.
- Anonim. 1970. *Rice Production Manual. Revised Edition*. Los Banos: UPCA-IRRI. Philippines. 382 p.
- Anonim. 2005. http://www.ems.psu.edu/~radovic/coal_structure.html. Diakses tanggal 26 Januari 2015.
- Anonim. 2012. <https://www.studyblue.com/notes/note/n/bio-101-study-guide-2012-13-hogan/deck/9709453>. Diakses tanggal 25 Januari 2015.
- Arisha, M. H., B. K. Liang., S. N. Muh. Shah, Z. H. Gong and D. W. Li. 2014. Kill Curve Analysis and Response of First Generation *Capsicum annuum* L. B12 Cultivar to Ethyl Methane Sulfonate. *Genetics and Molecular Research* 13 (4): 10049-10061.
- Ashok, Y. P., P. Sharma, A. Yadav. 1995. Effect of Different Ethyl Methane Sulfonate Treatments on Pollen Viability and Fruit Rot Incidence in Bell Pepper. *Ann. Agriculture* 16: 442-444.
- Azmi, J. 2006. Penentuan Kondisi Optimum Fermentasi *Aspergillus oryzae* untuk Isolasi Enzim Amilase pada Medium Pati Biji Nangka (*Arthocarpus heterophilus* Lmk.). *Jurnal Biogenesis*. 2 (2): 55-58.
- Bahar, B. and Akkaya, M. S. 2009. Effects of EMS Treatment on The Seed Germination in Wheat. *Journal Applied of Biological Science* 3: 59-64.
- Bahri, Syaiful., M. Mirzan dan M. Hasan. 2012. Karakterisasi Enzim Amilase dari Kecambah Biji Jagung Ketan (*Zea mays ceratina* L.). *Jurnal Natural Science* 1 (1): 132-143.
- Balai Pengkajian Teknologi Pertanian. 2010. *Kandungan Zat Besi Beras Hitam*. Yogyakarta. <http://www.yogya.litbang.deptan.go.id>. Diakses tanggal 20 Januari 2015.
- Baulcombe, D. C. and Huttly A. K. 1989. A Wheat α -Amy2 promoter is regulated by gibberelin in transformed oat aleurone protoplasts. *The EMBO Journal* 8 (7): 1907-1913.
- Biber, P.D. 2007. Evaluating a Chlorophyll Content Meter on Three Coastal Wetland Plant Species. *Journal of Agricultural Research* 16 (3): 442-444.
- Bih-King Chen and Levente L. Diosady. 2002. Enzymatic Aqueous Processing of Coconuts. *Int. Journal Application Science* 1 (1): 55-61.
- Biswas, B., A. Chowdhury, Bhattacharya, B. mandal. 2002. In vitro screening for increasing drought tolerance in rice. *In Vitro Cell Dev. Journal of Plant Biology* 38: 525-530.
- Cahyuningdari, D. 2002. *Pengaruh Ketersediaan Air Dan Pemberian Mulsa Serbuk Sabut Kelapa Pada Pertumbuhan Dan Kandungan Gula Reduksi Ubi Jalar (*Ipomoea batatas* Lamk.)*. Skripsi. Jurusan Biologi. FMIPA. UNS. Surakarta. Hal: 31.
- Chang, Te-Tzu and E. A. Bardenas. 1976. *The Morphology and Varietal Characteristics of the Rice Plant*. Technical Bulletin 4. The International Rice Research Institute. Los Banos. Philippines.

- Chen P. N., W. H. Kuo, C. L. Chiang, H. L. Chiou, Y. S. Hsieh and S. C. Chu. 2006. Black Rice Anthocyanins Inhibit Cancer Cells Invasion Via Repressions of MMPs and u-PA Expression. *Chemico-Biological Interactions* 163: 218–229.
- Chutipaijit S, S Cha-um and K. Sompornpailin. 2011. High Contents of Proline and Anthocyanin Increase Protective Response to Salinity in *Oryza sativa* L. spp. Indica. *AJCS* 5 (10): 1191-1198.
- Chopra, V. L. 2005. Mutagenesis: Investigating the Process and processing the Outcome for Crop Improvement. *Current Science* 89 (2): 353-359.
- Dachriyanus. 2004. *Analisis Struktur Senyawa Organik secara Spektrofotometri*. CV. Trianda Anugrah Pratama. Cetakan pertama. Padang. hal: 1-2.
- Davies, P. J. 1995. Plant Hormones, Physiology Biochemistry and Molecular Biology. *Kluwer Academic Publishers*. London. pp.6-7.
- Deepalakshmi, A. J. and Anandakumar, C. R. 2004. Creation of Genetic Variability for Different Polygenic Traits in Black Gram (*Vigna mungo* (L.) Hepper) through Induced Mutagenesis. *Legume Res* 27: 188-192.
- De Datta. S. K. 1981. *Principles and Practices of Rice Production*. A Wiley Interscience Publication. New York: John Wiley & Sons. 618 p.
- Devi, S. A. and Selvakumar, G. 2013. Chemical Mutagens Induced Alterations in Chlorophyll Mutants and Flower Development of Chilli (*Capsicum annuum* L.). *International Journal of Modern Agriculture* 2: 39-42.
- Devi, A. Sri and L. Mullainathan. 2011. Genotoxicity Effect of Ethyl Methanesulfonate on Root Tip Cells of Chilli (*Capsicum annuum* L.). *World Journal of Agricultural Sciences* 7 (4): 368-374.
- Dhamayanthi, K. P. M and Reddy, V. R. K. 2000. Cytogenetic Effects of Gamma Rays and Ethyl Methane Sulphonate in Chilli Pepper (*Capsicum annuum* L.). *Cytologia* 65: 129-133.
- Dwijoseputro, D. 1978. *Pengantar Fisiologi Tumbuhan*. PT Gramedia. Jakarta. Hal: 232.
- Emrani N., Arzani A., and Saeidi G. 2011. Seed Viability, Germination and Seedling Growth of Canola (*Brassica napus* L.) as Influenced by Chemical Mutagens. *Africa Journal Biotechnology* 10: 12602-12613.
- Endah, R. D., Enny, K. A. dan Fadilah. 2009. *Studi Awal Reaksi Sakarifikasi dan Fermentasi Tepung Sorghum (Sorghum bicolor L. Moench) dengan Katalis Enzim Glucoamylase dan Yeast (Saccharomyces cerevisiae)*. Jurusan Teknik Kimia Fakultas Teknik UNS. Surakarta. Hal: 7-15.
- Fahn, A. 1991. *Anatomi Tumbuhan*. Gadjah Mada Press. Yogyakarta. Hal: 44-48.
- Ferruzzi, M. G., Bohm V., Courtney P. D. and Schwartz S. J. 2006. Antioxidant and Antimutagenic Activity of Dietary Chlorophyll Derivatives Determined by Radical Scavenging and Bacterial Reverse Mutagenesis Assays. *Journal Food Science* 67: 2589-2595.
- Fischer, Hans. 1930. *On Hemin and The Relationships between Heme and Chlorophyll*. Nobel Lecture.
- Fogarty, W. M. and Benson, C. P. 1983. In Microbial Enzyme and Biotechnology. *European Journal of Applied Microbiology and Biotechnology*. 18: 271.

- Gardner, F.P., R.B. Pearce and R. I. Mitchell. 1991. *Fisiologi Tanaman Budidaya*. Penerjemah: Herawati Susilo, H. Jakarta: UI Press. Hal: 129-203.
- Gould, F.W. 1968. *Grass Systematics*. McGraw-Hill Book. New York. 382 p.
- Greulach, V. A. and Adams, E. J. 1973. *Plants an Introduction to Modern Botany*. Chaper Hill Mac Millan Publishing Co. Inc. New York. 176 p.
- Grubben dan Partohardjono. 1996. *Cereal: Plant Resources of South-East Asia PROSEA 10*. Bogor. 200 p.
- GRiSP (*Global Rice Science Partnership*). 2013. *Rice almanac, 4th edition*. Los Baños (Philippines): International Rice Research Institute. 283 p.
- Harborne, J.B. 1984. *Metode Fitokimia Penuntun Cara Modern Menganalisa Tumbuhan*. Penerjemah: Kosasih Padmawinata dan Iwang Soediro. Terbitan Kedua. Bandung: Penerbit ITB. Hal: 47-102, 152-153.
- Haryanti, S. 2010. Jumlah dan Distribusi Stomata pada Daun Beberapa Spesies Tanaman Dikotil dan Monokotil. *Buletin Anatomi dan Fisiologi* 18: 21-28.
- Hastuti, Sri, M.Si, dkk. 2007. *Buku Petunjuk Praktikum Kimia Analitik Dasar I*. Laboratorium Kimia Dasar FMIPA UNS. Surakarta. Hal: 14-22.
- Herawati, T dan R. Setiamihardja, 2000. *Pemuliaan Tanaman Lanjutan*. Program Pengembangan Kemampuan Peneliti Tingkat S1 Non Pemuliaan Dalam Ilmu Dan Teknologi Pemuliaan. Universitas Padjadjaran, Bandung.
- Heslot, H. 1977. *Chemical mutagens: Review of main mutagenic compounds*. In: *Manual On Mutation Breeding* (Second Edition). IAEA, Vienna. pp. 51-58.
- Hidema, J., Makino A., Kurita Y., Mae T., Ohiima K. 1992. Changes in the Level of Chlorophyll and Light-harvesting Chlorophyll a/b Protein PS II in Rice Leaves Agent Under Different Irradiances from Full Expansion Through Senescence. *Plant Physiology* 33 (8): 1209-1214.
- Hodgkiss, R.J. 2011. *About Light and Lighting*. <http://www.succulent-plant.com/light.html>. Diakses pada tanggal 25 Januari 2015.
- <http://www.yogya.litbang.deptan.go.id>. Diakses tanggal 13 Januari 2015.
- Huttly, A.K., Martienssen, R.A. and Baulcombe, D.C. 1988. Sequence Heterogenity and Differential Expression of The α -Amy2 Gene Family in Wheat. *Molecular and General Genetics* p. 241, 232-240.
- Imelda, M., Deswina, P., Hartati, S., Estiati, A., and Atmowijoyo, S. 2000. Chemical Mutation by Ethyl Methane Sulfonate (EMS) for Bunchy Top Virus Resistence in Banana. *Annales Bogorienses* 38 (3): 205-211.
- Iskandar, Sринi. M. 2001. *Pendidikan Ilmu Pengetahuan Alam*. CV. Maulana. Bandung. Hal: 144-145.
- Ismunadji, M., S.O. Manurung. 1988. Dalam: Ismunadji, M., S. Partohardjono, M. Syam, dan A. Widjono. (eds). *Padi Buku 1*. Bada Penelitian dan Pengembangan Pertanian. Pusat Penelitian dan Pengembangan Pertanian. Bogor. Hal: 55-102.
- Jabeen, N., B. Mirza. 2002. Ethyl methane sulfonate enhances genetic variability in *Capsicum annuum*. *Asian Journal of Plant Science* 1:425-428.

- Jacobsen, J. V. and Beach, L. R. 1985. Control of Transcription of α -Amylase and rRNA Genes in Barley Aleurone Layer Protoplast by Gibberellic Acid and Abscissic Acid. *Nature*. p. 316, 275-277.
- Jayanti, Raisha Tiara. 2011. *Skripsi: Pengaruh pH, Suhu Hidrolisis Enzim α -Amilase dan Konsentrasi Ragi Roti untuk Produksi Etanol Menggunakan Pati Bekatul*. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Sebelas Maret. Surakarta. Hal: 9-10.
- Kamra, O. P. & Brunner. 1977. *Chemical mutagens: Mode of action In: Manual On Mutation Breeding* (Second Edition). IAEA, Vienna. pp.: 59-64.
- Kamil, J. 1982. Teknologi Benih. Penerbit: Angkasa. Bandung. Hal: 23-24.
- Kaneko, T., Ohno, T., and Ohisa, A. 2005. Purification and Characterization of a Thermostable Raw Starch Digesting Amylase from a *Streptomyces* sp. Isolated In a Milling Factory. *Bioscience, Biotechnology and Biochemistry* 69 (6): 1073-1081.
- Kasno, A., M. Dahlan, dan Hasnam. 1992. *Pemuliaan Tanaman Kacangkacangan*. Balai Penelitian Tanaman Pangan Malang. Jawa Timur. Hal: 439.
- Kim J. Y., M. H. Do and S. S. Lee. 2006. The Effects of a Mixture of Brown and Black Rice on Lipid Profiles and Antioxidant Status in Rats. *Annals of Nutrition and Metabolism* 50: 347-353.
- Kristamtini. 2009. *Mengenal Beras Hitam dari Bantul*. Balai Pengkajian Teknologi Pertanian (BPTP) Yogyakarta. Dimuat dalam Tabloid Sinar Tani 13 Mei 2009.
- Kumar, G. and Gupta, P. 2009. Induced Karyo-Morphological Variations in Three Phenol-deviants of *Capsicum annuum* L. *Turkish Journal of Biology* 33: 123-128.
- Kurzon. 2008. *Chlorophyll ab spectra. png*. [http://en.wikivisual.com/index.php Image:Chlorophyllab spectra.png](http://en.wikivisual.com/index.php/Image:Chlorophyllab%20spectra.png). Diakses tanggal 21 Januari 2015.
- Lazarus, C., Baulcombe, D. C. and R. Martienssen. 1985. α -Amylase Genes of Wheat are Two Multigene Families which are Differentially Expressed. *Plant Molecular Biology* 5: 13-24.
- Lestari, E. G. 2006. Hubungan antara Kerapatan Stomata dengan Ketahanan Kekeringan pada Somaklon Padi Gajahmungkur, Towuti dan IR 64. *Jurnal Biodiversitas* 7 (1): 44-48.
- Limantara, L. 2009. Pengaruh Asam Kuat dan Asam Lemah terhadap Agregasi dan Feofitinisasi Klorofil a dan b. *Indonesian Journal of Chemistry* 9 (1): 70-76.
- Mappiratu dan Nurhaeni. 2009. *Penuntun Praktikum Enzim Pangan*. Jurusan Kimia FMIPA Universitas Tadulako. Palu. Hal: 23.
- Martin, A.C., H.S. Zim, and A.L. Nelson. 1951. *American wildlife and plants: A guide to wildlife food habits*. Dover Publications. New York. <http://plants.usda.gov/core/profile?symbol=ORSA>. Diakses tanggal 3 Februari 2015.
- Marquez, U. M. L., Barros R. M. C., Sinnecker P. 2005. Antioxidant Activity of Chlorophylls and Their Derivates. *Food Research International* 38: 885-891.

- Mc Cree, K. J. and S. D. Davis. 1994. Effect of Water Stress and Temperature on Leaf and on Size and Number of Epidermal Cells in Grain Sorghum. *Crop Science* 14: 751-705.
- Megazyme [Megazyme International Ireland]. 2012. *Mixed Linkage Beta-Glucan Assay Procedure (McCleary method) K-BGLU 07/11*. AACC Method. 32-33. AOAC Method 995.16. EBC Methods 4.11.1.4.16.1 and 8.11.1. ICC Standard Method No. 166.2012.
- Manzila dkk. 2010. Pengaruh Perlakuan Ethyl Methane Sulfonate pada Tanaman Cabai (*Capsicum annum* L.) dan Ketahanannya terhadap Chilli Veinal Mottle Virus (ChiVMV). *Jurnal Agronomi Indonesia* 38 (3): 205-211.
- Mohr, H. and P. Schopper. 2005. *Plant Physiology*. Springer-verlag berlin Heidelberg. New York. p. 70-78.
- Moo Young, M. 1985. *Comprehensive Biotechnology*. Editor: A. T. Bull and H Dalton. Pergamon Press. Oxford. p. 113-280.
- Mudjisihono, R., T. Santoso dan R. Hendrata. 2001. *Laporan Hasil Pengkajian Uji Varietas Rojolele Kabupaten Klaten*. Balai Pengkajian Teknologi Pertanian. Yogyakarta. Hal: 13.
- Murata, Y. 1969. *Physiological Responses to Nitrogen in Plants*. In *Physiological Aspect of Crop Yield*. ASA-CSSA Madison, Winconsin, USA. p. 235-259.
- Muthalib, A. 2009. *Klorofil dan Penyebaran di Perairan*. <http://www.abdulmuthalib.co.cc/2009/06/>. Diakses pada tanggal 25 Januari 2015.
- Natarajan, A.T. 2005. Chemical Mutagenesis: From Plants to Human. *Current Sciences* 89: 312-317.
- Nurdin., Clara M.K., Ikeu T., dan M. Januawati. 2009. Kandungan Klorofil Berbagai Jenis Tanaman dan Cu- Turunan Klorofil serta Karakteristik Fisiko-Kimianya. *Jurnal Gizi dan Pangan* 4 (1): 13 – 19.
- Nolan, R. C., Lin, L.-S. and Ho, T. H. D. 1987. The Effect of Absciscic Acid on The Differential expression of α -Amylase Isozymes in Barely Aleurone Layers. *Plant Molecular Biology* 8 p. 13 -22.
- Olszewski, N., Tai-ping Sun and F. Gubler. 2002. Gibberellin Signaling: Biosynthesis, Catabolism and Response Pathways. *The Plant Cell* 14: S61-S80.
- Opik, H. and S. Rolfe. 2005. *The Physiology of Flowering Plants 4th Edition*. Cambridge University Press. p. 179-183
- Oyeleke, S. B. and Oduwale, A. A. 2009. Production of Amylase by Bacteria Isolated from a Cassava Waste Dumpsite in Minna, Niger State, Nigeria. *African Journal of Microbiology Research* 3 (4): 143-146.
- [Plants Database](#) USDA, NRCS. 2006. *The PLANTS Database* (<http://plants.usda.gov>, 17 October 2006). National Plant Data Center, Baton Rouge, LA 70874-4490 USA, and [ITIS](#) Retrieved October 17, 200. http://archive.gramene.org/species/oryza/rice_taxonomy.html. Diakses tanggal 3 Februari 2015.
- Polato, Nicholas. 2014. http://archive.gramene.org/species/oryza/rice_illustrations.html. Diakses tanggal 3 Februari 2015.

- Rachmawati, D., Moh. Nasir, Sudjino, Kumala Dewi. 2009. *Bahan Ajar Fisiologi Tumbuhan*. Fakultas Biologi Universitas Gadjah Mada. Yogyakarta. Hal: 83.
- Rhaese, H. J. and Naomi, K. B. 1973. The Molecular Basis of Mutagenesis by Methyl and Ethyl Methanesulfonates. *European Jurnal of Biochemistry* 32: 166-172.
- Russel. P. J. 1992. *Genetics*. Harper Collins Publisher. Third Edition. Harper Collins Publisher. New York. 574 p.
- Sakin M. A. 2002. The Effect of Different Doses of Gamma Ray and EMS on Formation of Chlorophyll Mutation in Durum Wheat (*Triticum durum* Desf.). *Tarim Bilimleri Dergisi* 3 (1): 15-21.
- Salisbury, F. B. dan Ross, C. W. 1995. *Fisiologi Tumbuhan Jilid 2*. Penerjemah: Lukman, D.R dan Sumaryono. Bandung: ITB. 343 p.
- Sambrook, J. and Russel, D. W. 2001. *Molecular Cloning: A Laboratory Manual*. Cold Spring Harbor Laboratory Press. New York. 13 p.
- Sargent, J. G. 1980. α - Amylase Isoenzymes and Starch Degradation. *Cereal Res Commun.* 8: 77-86.
- Sathawane, K. N. 2012. Sodium Azide (SA) Induced Higher Mutations Frequency of Yellow Seed Coat Colour in *Brassica juncea* (L.) Coss. & Czern. cv. Varuna. *Bionano Frontier* 5: 2 -11.
- Sega, G.A. 1984. A Review of the Genetic Effects of Ethyl Methanesulfonate. *Mutat. Res.* 134: 113-142.
- Serrat *et al.* 2014. EMS Mutagenesis in Mature Seed-Derived Rice *Calli* as a New Method for Rapidly Obtaining TILLING Mutant Populations. *Plant Methods* 10 (5): 1-13.
- Setiari, N dan Yulita N. 2009. Eksplorasi Kandungan Klorofil pada beberapa Sayuran Hijau sebagai Alternatif Bahan Dasar *Food Supplement*. *Jurnal BIOMA* 11 (1): 6-10.
- Shakhashiri. 2008. *Chemical of the week: Acetic Acid and Acetic Anhydride*. *General Chemistry*. <http://scifun.org>. Diakses tanggal 5 Januari 2015.
- Simbolon, Valpi A. 2012. Pengaruh Mutagen Etil Metan Sulfonate (EMS) terhadap Pertumbuhan Awal Tanaman Padi Merah (*Oryza sativa* L. 'Segreng'). *Seminar*. Fakultas Biologi Universitas Gadjah Mada. Yogyakarta. Hal: 11-16.
- Singh, S. K., V. Yerramilli, R. N. Khawale. 2007. Molecular Marker-assisted Selection of In Vitro Chemical Mutageninduced Grapevine Mutans. *Current Science* 92: 1056-1060.
- Siregar, H. 1981. *Budidaya Tanaman Padi di Indonesia*. P.T. Sastra Budaya. Jakarta. Hal: 320.
- Soeranto, H. 2003. *Peran IPTEK Nuklir dalam Pemuliaan Tanaman untuk Mendukung Industri Pertanian*. Puslitbang Teknologi Isotop dan Radiasi. Badan Tenaga Nuklir Nasional. Jakarta. p.308-316.
- Sudarmo, S. 1991. *Pestisida*. Penerbit Kanisius. Yogyakarta.
- Sukandar, D., Radiastuti N. dan Utami S. 2009. Aktivitas Antibakteri Minyak Atsiri Rimpang Lengkuas Merah (*Alpinia purpurata*) Hasil Destilasi. *Jurnal Biologi Lingkungan*. 3 (2): 94-100.
- Suparyono dan Agus Setyono. 1993. *Padi*. Jakarta: Penebar Swadaya. Hal: 118.

- Suradinata, T. S. 1997. *Struktur Tumbuhan Berbiji*. Fakultas Matematika dan Ilmu Pengetahuan Alam ITB. Bandung. Hal: 21.
- Surowinoto, S. 1982. *Budidaya Tanaman Padi*. Jurusan Agronomi Faperta IPB. Bogor. Hal: 56-58.
- Taiz L. and Zeiger E. 1991. *Plant Physiology*. The Benyamin/Cumming Publishing Company. Tokyo. p.219-247.
- Tanaka, Y., S. S. Sugano, T. Shimada, dan I. H. Nishimura. 2013. Enhancement of Leaf Photosynthetic Capacity Through Increased Stomatal Density in Arabidopsis. *New Phytologist* 198 (1) : 757-764.
- Vergara, B. S. 1980. *Rice Plant Growth and Development*. In B. S. Luh (Ed.) Rice: Production and Utilization. AVI Publishing Company. Westport, Connecticut. p.75-86.
- Vergara, B. S. 1976. *Physiological and Morphological Adaptability of Rice Varieties to Climate*. In: Proceedings of the Symposium Climate and Rice. International Rice Research Institute. p.67-86.
- Wahyudi, Aditya., Tengku Nurhidayah. 2014. Pertumbuhan Bibit Generasi M-1 Tanaman Padi Gogo (*Oryza sativa* L.) Varietas Lokal dengan Perlakuan Mutagen *Ethyl Methane Sulfonate* (EMS). *Jurnal Online Mahasiswa Fakultas Pertanian Universitas Riau* 1 (2): 1-15.
- Weaver, R. F. and P. W. Hendrik. 1997. *Genetics*. 3rd Ed. McGraw-Hills. Co. Inc. Dubuque. 311 p.
- Yoshida, S. 1981. *Fundamentals of Rice Crop Science*. Internasional Rice Research Institute. Los Banos. Philipine. 269 p.
- Yudhvir, S. 1995. Mutagenic Effect of N-Nitroso-N-Methyl Urea and Ethyl Methane Sulfonate on the incidence of fruit rot in tomato. *New Agriculturist* 6: 89-94.
- Zaenab, A., Modu, S., Falmata, A.S., and Maisaratu. 2000. Laboratory Scale Production of Glucose Syrup by the Enzymatic Hydrolysis of Starch Made from Maize, Millet, and Sorghum. *Biokemistri* 23 (1): 1-8.
- Zwar, J. A. and R. Hooley. 1986. Hormonal regulation of amilase gene transcription in wild oat (*Avena fatua* L.) aleurone protoplasts. *Plant Physiology* 80: 459-463.