AUSTRALIAN JOURNAL of BIOLOGICAL SCIENCES

VOLUME 16

•

MELBOURNE 1963 .

AUSTRALIAN JOURNAL OF BIOLOGICAL SCIENCES

A medium for the publication of results of original scientific research in the biological sciences with special emphasis on the experimental phases. Volumes 1 to 5 issued as the Australian Journal of Scientific Research, Series B: Biological Sciences.

Published by the Commonwealth Scientific and Industrial Research Organization. Issued quarterly, £2 per annum.

BOARD OF STANDARDS

The Board of Standards for this Journal is appointed by the Commonwealth Scientific and Industrial Research Organization and the Australian Academy of Science and consists of Professor W. P. Rogers (Chairman), Mr. A. E. Scott (Editor-in-Chief), Professor N. S. Bayliss, Professor Sir Macfarlane Burnet, and Professor J. S. Turner.

ADVISORY COMMITTEE

Acceptance of papers for this Journal is in the hands of an Advisory Committee appointed by the Board of Standards and consisting of Mr. A. E. Scott (Editor-in-Chief and Chairman), Professor Sir Macfarlane Burnet, Professor R. N. Robertson, Professor W. P. Rogers, and Professor J. S. Turner.

All enquiries and manuscripts should be forwarded to: The Editor-in-Chief,

Australian Journal of Biological Sciences,

Commonwealth Scientific and Industrial Research Organization,

372 Albert Street, East Melbourne, C.2, Victoria

MELBOURNE

NUMBER 1, FEBRUARY 1963

Balanced Polymorphisms with Unlinked Loci. By P. A. P. Moran	PAGE 1
Cambial Regeneration in Approach Grafts between Petioles and Stems. By Pamela M. Warren Wilson and J. Warren Wilson	
The Effect of a Small Axial Pressure on the Growth of the Epicotyl of Vicia faba var. minor Beck. By R. H. Sedgley and K. P. Barley	70
Physical Environment and Symbiotic Nitrogen Fixation. I. The Effect of Root Temperature on Recently Nodulated <i>Trifolium subterraneum</i> L. Plants. By A. H. Gibson	28
Relationship between Effective Nodulation and Time to Initial Nodulation in a Diploid Line of <i>Trifolium ambiguum</i> M. Bieb. By F. W. Hely	
The Root Rot-Fusarium Wilt Complex of Peas. By A. Kerr	55
Diurnal-Nocturnal Changes in the Starch of Tobacco Leaves. By N. K. Matheson and J. M. Wheatley	=0
Germination of Conidia of Peronospora tabacina Adam. II. Germination in vivo. By C. J. Shepherd and M. Mandryk	ı 77
Environment and Sporulation in Phytopathogenic Fungi. IV. The Effect of Light on the Formation of <i>Peronospora tabacina</i> Adam. By I. A. M Cruickshank	
 Environment and Sporulation in Phytopathogenic Fungi. V. Monilinia fructi- cola (Wint.) Honey: Effect of Water Relations on Regeneration of Conidia in vivo. By J. B. Corbin and I. A. M. Cruickshank 	f
Studies on Phytoalexins. VI. Pisatin: The Effect of some Factors on Its Formation in <i>Pisum sativum</i> L., and the Significance of Pisatin in Disease Resistance. By I. A. M. Cruickshank and Dawn R. Perrin .	1
Promotion of Cell Division by Extracts from Pea Seedlings. By J. A. Zwa and F. Skoog	r . 1 _, 29

÷

NUMBER 1, FEBRUARY 1963 (Continued)

	PAGE
Estimation of Diffusion Pressure Deficit by Correlation with Relative Turgidity and Beta-Radiation Absorption. By P. C. Whiteman and G. L. Wilson	140
Studies on Endemic Goitre. I. The Identification of Thioglucosides and their Aglucones in Weed Contaminants of Pastures in Goitrous Areas of Tasmania and Southern Queensland. By H. S. Bachelard and V. M. Trikojus	147
Studies on Endemic Goitre. II. The Behaviour of 3-Methylsulphonylpropyl Isothiocyanate (Cheirolin) and other Isothiocyanates in Bovine Rumen Liquor. By H. S. Bachelard and V. M. Trikojus	166
Studies on Endemic Goitre. III. An Investigation of the Antithyroid Activities of Isothiocyanates and Derivatives with Observations on Fractions of Milk from Goitrous Areas. By H. S. Bachelard, Mary T. McQuillan, and V. M. Trikojus	177
Nucleic Acids and Protein Stores in the Merino Sheep. By C. J. Masters	192
The Reducing Activity of Ram and Bull Spermatozoa. By A. W. Blackshaw	201
The Use of Colchicine and Colcemid for Metaphase Stasis in the Matrix Cells of Wool Follicles. By I. E. B. Fraser	211
Some Effects of Sulphur-containing Amino Acids on the Growth and Composi- tion of Wool. By P. J. Reis and P. G. Schinckel	218
The Conformation of a Soluble Wool Keratin Derivative. By B. S. Harrap	231
The Isolation and Properties of some Soluble Proteins from Wool. V. The Isolation of the High-sulphur Protein SCMKB2. By J. M. Gillespie	241
The Isolation and Properties of some Soluble Proteins from Wool. VI. The Physicochemical Properties of SCMKB2. By J. M. Gillespie and B. S. Harrap	252
The Isolation and Properties of some Soluble Proteins from Wool. VII. The Heterogeneity of the High-sulphur Proteins. By J. M. Gillespie	259

Short Communication

Su	sceptibility	\mathbf{to}	Da	mpin	lg-off	in	Seed	llings	of	Medicago	dentic	ulata	Willd.	
	and M .	min	ima	(L.)	Bart	. du	tring	the e	early	Post-eme	ergence	Period	l. By	
	W. D. A								-		-		-	281
	• • •													

.

.....

NUMBER 2, MAY 1963

	PAGE
The Control of Tillering in the Barley Plant. II. The Control of Tiller-bud Growth during Ear Development. By D. Aspinall	285
Ultrastructure of the Developing Wheat Endosperm. By M. S. Buttrose	305
Changes in Carbohydrate, Protein, and Non-protein Nitrogenous Compounds of Developing Wheat Grain. By A. C. Jennings and R. K. Morton	318
Changes in Nucleic Acids and other Phosphorus-containing Compounds of Developing Wheat Grain. By A. C. Jennings and R. K. Morton	332
Starch-gel Electrophoresis of Wheat Flour Proteins. By Janet S. D. Graham	342
Studies of Proteins of Developing Wheat Endosperm: Fractionation by Ion- exchange Chromatography. By Janet S. D. Graham, R. K. Morton, and D. H. Simmonds	350
Studies of Proteins of Developing Wheat Endosperm: Separation by Starch-gel Electrophoresis and Incorporation of [³⁵ S]Sulphate. By Janet S. D. Graham and R. K. Morton	357
Cytological Studies of Protein Bodies of Developing Wheat Endosperm. By A. C. Jennings, R. K. Morton, and B. A. Palk	366
Isolation and Characterization of Protein Bodies from Developing Wheat Endo- sperm. By Janet S. D. Graham, R. K. Morton, and J. K. Raison	375
Amino Acids and Protein Synthesis in Developing Wheat Endosperm. By A. C. Jennings and R. K. Morton	384
Kinin Activity from Plant Extracts. I. Biological Assay and Sources of Activity. By W. Bottomley, N. P. Kefford, J. A. Zwar, and the Late P. L. Goldacre	395
Kinin Activity from Plant Extracts. II. Partial Purification and Fractionation of Kinins in Apple Extract. By J. A. Zwar, W. Bottomley, and N. P. Kefford	407
The Physiology of Sugar-cane. VI. Effects of Temperature, Light, and Water on Set Germination and Early Growth of <i>Saccharum</i> spp. By P. C. Whiteman, T. A. Bull, and K. T. Glasziou	416
Ionic Relations of Cells of Chara Australis. VI. Fluxes of Potassium. By A. B. Hope	429

.

NUMBER 2, MAY 1963 (Continued)

The Submicroscopic Cytology of Superficial Scald, a Physiological Disease of Apples. By Joan M. Bain and F. V. Mercer	442 [.]
Nuclear Distribution and Behaviour throughout the Life Cycles of <i>Thanate-</i> <i>phorus</i> , <i>Waitea</i> , and <i>Ceratobasidium</i> Species. By N. T. Flentje, Helena M. Stretton, and E. J. Hawn	450
Purification and some Properties of Centrosema Mosaic Virus. By N. C. Crowley and R. I. B. Francki	4 68.
Spermatozoa in the Genital Tract of the Ewe. I. Rapidity of Transport. By P. E. Mattner and A. W. H. Braden	473.
The Enzymatic Activity of Mouse Testis. By A. W. Blackshaw	482.
Studies in Artificial Selection of Quantitative Characters. I. Selection for Abdo- minal Bristles in <i>Drosophila melanogaster</i> . By B. L. Sheldon	4 90.
Studies in Artificial Selection of Quantitative Characters. II. Selection for Body Weight in Drosophila melanogaster. By B. L. Sheldon	516
A Further Study on the Extraction of Reduced Proteins from Wool. By B. S. Harrap and J. M. Gillespie	54 2-

Short Communication

Antibiotic Sensitivities of the Root Nodule Bacteria. By P. H. Graham ... 557

NUMBER 3, AUGUST 1963

. -

	PAGE
Studies on the Growth of the Barley Apex. I. Interrelationships between Primordium Formation, Apex Length, and Spikelet Development. By P. B. Nicholls and L. H. May	
Germination Patterns Shown by the Light-sensitive Seed of Anagallis arvensis. By A. E. Grant Lipp and L. A. T. Ballard	572
The Ultrastructure of the Vegetative Cell of Blue-Green Algae. By D. C. Wildon and F. V. Mercer	202
Lysogeny in <i>Rhizobium leguminosarum</i> and <i>Rh. trifolii</i> . By E. A. Schwinghamer and D. J. Reinhardt	FOR
Silage Bacteriology. I. Water Activity and Temperature Relationships of Silage Strains of <i>Lactobacillus plantarum</i> , <i>Lactobacillus brevis</i> , and <i>Pediococcus cerevisiae</i> . By G. W. Lanigan	
Plant Responses to Saline Substrates. III. Effect of Nutrient Concentration on the Growth and Ion Uptake of <i>Hordeum vulgare</i> during a Sodium Chloride Stress. By H. Greenway	
Electric Potentials and Auxin Translocation in Avena. By I. A. Newman	629
The Determination of the Salt Relations of the Cytoplasmic Phase in Cells of Beetroot Tissue. By M. G. Pitman	647
The Relationship between Hydrogen Evolution, Hydrogen Exchange, Nitrogen Fixation, and Applied Oxygen Tension in Soybean Root Nodules. By F. J. Bergersen	
Analysis of Diallel Cross Experiments in a Split-plot Situation. By P. W. M. John	681
Spermatozoa in the Genital Tract of the Ewe. II. Distribution after Coitus. By P. E. Mattner	687
The Spatial Relationships between Skin Follicles during their Development in Sheep. By J. H. Claxton	~~~
The Electrophoretic Heterogeneity of Ovine Lactate Dehydrogenase. By C. J. Masters	-
Properties of Gluten Fractions prepared by Ion-exchange Chromatography on Carboxymethyl-cellulose. By J. W. Lee, M. V. Tracey, D. J. Winzor, C. W. Wrigley, and H. Zentner	
Proteolysis of Wool and its S-Carboxymethyl Derivatives by Pronase and other Proteases. By P. H. Springell	727

. •

NUMBER 4, NOVEMBER 1963

· · · · · · · · · · · · · · · · · · ·	PAGE 👘
The Evolutionary Significance of Sugar Accumulation in Saccharum. By	
T. A. Bull and K. T. Glasziou	737
Studies on the Use of Cetyl Alcohol as a Transpiration Suppressor. By P. E.	
Kriedeman and T. F. Neales	743
Rooting of Cuttings of Acer rubrum L. and Eucalyptus camaldulensis Dehn.	
By E. P. Bachelard and B. B. Stowe	751
Ultrastructure of the Developing Aleurone Cells of Wheat Grain. By M. S.	
Buttrose	768
Host-Pathogen Relations in Powdery Mildew of Barley. III. Utilization of	
Respiratory Energy. By Adele Millerd and K. J. Scott	775
The Mechanism of Host Penetration by Thanatephorus cucumeris. By N. T.	
Flentje, R. L. Dodman, and A. Kerr	784
Mycosphaerella pinodes. II. The Phenology of Ascospore Release. By M. V.	
Carter	800
Studies of the Fine Structure of the Wax Layer of Sultana Grapes. By T. C.	
Chambers and J. V. Possingham $\ldots \qquad \ldots \qquad \vdots \qquad \ldots \qquad \ldots$	818 [.]
Factors Affecting Crossing Over in the Tomato. By B. Griffing and J. Langridge	826
Comparisons of Potentials for General Combining Ability Selection Methods	
Utilizing One or Two Random-mating Populations. By B. Griffing	838
Skin Grafting between Sub-lines of Inbred Strains of Mice. By Berenice Kindred	863
Cytological Observations on Cell Strains Established in Culture from Insect	
Ovarian Tissue. By J. A. Thomson and T. D. C. Grace	869
Spermatozoa in the Genital Tract of the Ewe. III. The Role of Spermatozoan	
Motility and of Uterine Contractions in Transport of Spermatozoa. By	
P. E. Mattner	877
The Effect of Ultraviolet Radiation on Ram and Bull Spermatozoa. By R. G.	
Wales and C. H. Choong	885
The Use of Various Diluents for Deep-freezing Bull Spermatozoa. By C. H.	
Choong and R. G. Wales	896
Fatty Acid Components of Ovine Tissue Lipids, and the Response to Prolonged	
Protein Depletion. By D. J. Horgan and C. J. Masters	905

Short Communications

Iron in the Developing Soybean Nodule. By F. J. Bergersen	916
Overwintering of Clover Nodules in Alpine Conditions. By F. J. Bergersen	,
F. W. Hely, and A. B. Costin	920
Fructose and Glucose Utilization by Lamb and Sheep Brain. By B. P. Setchel	1 922
The Action of the β -Glucosidase of Stachybotrys atra on p-Nitropheny	1
β -Quinovoside. By M. A. Jermyn	926
Index to Volume 16	927

viii

ē.

L'AL MARK

ġ.

.

ŧ