

# CURRICULUM VITAE

## 1. BIOGRAPHICAL

Name: Charles Whitehead

Position: Professor and Head of Department of Botany and Plant Biotechnology

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## 2. TEACHING OUTPUTS

### 2.1 Undergraduate

Course: Plant Physiology

### 2.2 Postgraduate

Course: Postharvest Physiology and Technology of Perishable Commodities

## 3. RESEARCH OUTPUTS

### 3.1 Scientific Publications

30 in peer reviewed articles

### 3.2 Research Based Technical Reports (Since 1995)

20 for various national and international companies.

### 3.3 International Conferences (Since 1995)

12 papers at various postharvest conferences.

### 3.4 National Conferences (since 2001)

14 papers

#### **4. OTHER RESEARCH RELATED ACTIVITIES (Since 1995)**

##### **4.1 Industrial Symposia**

2 papers

##### **4.2 Short Courses and Workshops to Industry (since 1997)**

4 postharvest handling courses presented to industry.

##### **4.4 Collaboration with Other Researchers and Industry (since 1997)**

1. Prof. A.H. Halevy, Department of Horticulture, Hebrew University of Jerusalem, Israel.

Role of short-chain saturated fatty acids in ethylene sensitivity.

2. Lebombo Growers Trust, Komatipoort, South Africa.

Postharvest handling and ripening of bananas.

3. Banana Growers Association of S.A.

Export of bananas by sea freight.

4. Hadeco Bulb Growers, Roodepoort, South Africa.

a. Effect of octanoic acid on flowering of Dutch iris.

b. Effect of sucrose pulsing on longevity of cut freesia flowers.

5. Prof. K.I. Kunert, University of Pretoria, South Africa

Peptide proteinase inhibitors in papaya plants.

6. Dr. W Gaum, Technicon SA, South Africa

The effect of sucrose pulsing and 1-MCP on the longevity of cut freesia flowers.

7. Peppadew International (Pty) Ltd

Postharvest handling of Peppadew peppers.

8. Geest, UK.

a. Improving the longevity of fresh cut fruit for export to the UK.

b. Export of tomatoes to the UK by sea freight.

9. Rohm and Haas (Italy)

S.A. and Spanish registration for the use of 1-MCP to inhibit ethylene action in tomatoes and lettuce.

10. Denny Mushrooms

Comparison of different packing materials and storage temperatures on mushroom quality.

#### **4.4 Scientific Committees and Research Management**

##### **4.4.1 Membership of Scientific Bodies** (since 1997)

International Society for Horticultural Science

South African Association of Botanists

Scandinavian Society for Plant Physiologists

##### **4.4.2 Membership of Councils and Editorial Boards** (since 1997)

Member of council - ***SA Association of Botanists***.

Member of the editorial board of ***Physiologia Plantarum***.

Member of editorial review board of ***SA Journal of Botany***.

##### **4.4.3 Reviewer for Scientific Journals** (since 1997)

Reviewer for several national and international scientific journals.

##### **4.4.4 Reviewer/moderator for Grant Bodies and Universities** (since 1997)

1. Reviewer for the United States-Israel Binational Agricultural Research and Development Fund.

2. Reviewer for staff promotion - Hebrew University of Jerusalem, Israel.
3. Reviewer for appointment of Adocent@ - Lund University, Lund, Sweden.
4. Reviewer for the NRF, South Africa.
5. Moderator for Botany - Potchefstroom University for CHE/Northwest University
6. Moderator for Horticulture - Technicon SA/Unisa
7. Moderator for Botany - University of KwaZuluNatal

#### **4.4.5 Advisory committee - International Symposia (since 1997)**

Member of the international advisory committee for International Symposium on Postharvest Physiology of Perishable Commodities held in Israel in 2000.

Member of the scientific committee of Management of Quality in Chains. Bangkok, Thailand, 2006.

Member of the scientific committee of Asia-Pacific Symposium on Quality Management of Fresh-Cut Produce. Bangkok, Thailand, 2007.

Member of the scientific committee of the Asia-Pacific Symposium on Assuring Quality and Safety of Agri-Foods, Bangkok, Thailand, 2008.

#### **4.4.6 Supervisor for post-graduate students**

##### **Degrees awarded (since 1997)**

14 masters and doctoral degrees.

##### **Current students**

MSc: 1 students

PhD: 1 students

#### **5. CURRENT RESEARCH ACTIVITIES**

Project 1: The control of senescence and ripening in plants.

Theme: An investigation into the mechanisms involved in the control of senescence and ripening in plants with the view to develop effective mechanisms to delay senescence and ripening.

- I. Ethylene signal transduction in senescing cut flowers – an investigation into the control of ethylene signal transduction during senescence and the components of the transduction cascade.
- II. Ethylene sensitivity in plant tissues – an investigation into the mechanisms involved in the control of ethylene sensitivity in plant tissues.
- III. The ripening, postharvest treatment and storage of fruits and vegetables – an investigation into the ripening and senescence of various fruits and vegetables, their ideal stage of harvesting, postharvest treatments to increase longevity and storage at low temperatures and in controlled atmospheres.
- IV. Postharvest treatments of cut flowers - the use of preservatives to improve the vase life of cut flowers.

Project 2: The effect of carbonated water on the production and quality of horticultural produce.

Theme: An investigation into the effect of treatment with carbonated water on the production and postharvest quality of different horticultural products.

Enrichment with carbon dioxide in the form of carbonated water results in the stimulation of photosynthesis. Stimulation of photosynthesis in turn results in the enhancement of plant growth and improvement of yield and product quality. An increase of productivity and quality result in an increase in profitability and consumer satisfaction.

## **6. TECHNOLOGY DEVELOPMENT (since 1995)**

1. Development of a banana ripening protocol. A banana ripening protocol was developed for Lebombo Growers Trust to ripen bananas to obtain the quality required for marketing by Woolworths.
2. Development of a banana export protocol. South Africa is a banana producer, but does not export bananas abroad. A protocol was developed for the Banana Growers Association of South Africa to successfully export bananas by sea freight to Libya.
3. Development of a tomato export protocol. A protocol was developed for Geest (UK) to successfully export tomatoes by sea freight from South Africa to the UK.
4. Development of an electro-activated water (EAW) technique to improve yield and postharvest quality of perishable commodities.
5. Development of a protocol for the registration of 1-MCP to be used in the treatment of tomatoes and

lettuce in South Africa and Spain. This protocol is developed for Rohm and Haas (Italy).

6. Development of a handling protocol for Peppadew peppers. This protocol was developed for Peppadew International for the postharvest handling of peppers prior to processing.

#### **7. COMMUNITY DEVELOPMENT (since 1995)**

1. Sasol, Secunda - Small farming community development program in collaboration with Sasol Synthetic Fuels aimed at the development of unemployed people in the Secunda district, South Africa.

2. Eastern Plats/Lonro - A similar project to the one in Secunda was launched by Eastern Platinum Mines in the Bapong district, South Africa

3. Opus Dei - Community development project in the Sasolburg district, South Africa, in collaboration with Opus Dei and Omnia Fertilizers.

#### **8. EXAMPLES OF PUBLICATIONS**

Whitehead, C.S. and G.H. de Swardt. 1980. The inhibitory effect of silver ions on certain metabolic processes after uptake and distribution in different floral parts of carnations. *Agroplantae* 12:61-64.

Whitehead, C.S. and G.H. de Swardt. 1982. Extraction and activity of polyphenoloxidase and peroxidase from senescing leaves of *Protea neriifolia*. *S.A. Journal of Botany* 1 (4):127-130.

Huysen, C. and C.S. Whitehead. 1982. The effect of phenolic compounds on certain enzymes and selected metabolic processes in the leaves of *Protea neriifolia*. *S.A. Journal of Botany* 1 (3): 81-81..

Whitehead, C.S. 1982. The effect of aldicarb on certain metabolic processes in isolated tobacco cells. *S.A. Journal of Botany* 1(3) 83-83.

Whitehead, C.S., D.W. Fujino and M.S. Reid. 1983. The role of pollen ACC and pollen tube growth in ethylene production by carnation. *Acta Horticulturae* 141:221-227.

Whitehead, C.S., D.W. Fujino and M.S. Reid. 1983. The identification of the ethylene precursor ACC in pollen. *Scientia Horticulturae* 21:291-297.

Whitehead, C.S. and H. Coetzee. 1984. The effect of aldicarb on certain aspects of the ultrastructural organization in leaves and roots of *Nicotiana tabacum*. *S.A. Journal of Botany* 3 (3):163-168.

Whitehead, C.S., A.H. Halevy and M.S. Reid. 1984. Control of ethylene synthesis during development and senescence of carnation petals. *J. Amer. Soc. Hort. Sci.* 109 (4):473-475.

Whitehead, C.S., A.H. Halevy and M.S. Reid. 1984. Roles of ethylene and ACC in pollinated and wound-induced senescence of *Petunia hybrida* L. *Physiologia Plantarum* 61 (4):643-648.

Halevy, A.H., C.S. Whitehead and A.M. Kofranek. 1984. Does pollination induce corolla abscission of cyclamen flowers by promoting ethylene production? *Plant Physiology* 75 (4):1090-1093.

Reid, M.S., D.W. Fujino, N.E. Hoffman and C.S. Whitehead. 1984. 1-Aminocyclo-propane-1-carboxylic acid (ACC) - The transmitted stimulus in pollinated flowers? *Journal of Plant Growth Regulation* 3 (4):189-197.

Steenkamp, L.A. and C.S. Whitehead. 1988. The effect of aldicarb on certain metabolic processes in leaves of *Nicotiana tabacum*. *S.A. Journal of Science* 84:450-452.

Stirton, C.H. and C.S. Whitehead. 1988. The future of the Botanical Research Institute. *S.A. Journal of Science* 84 (7): 564.

Whitehead, C.S. and A.H. Halevy. 1989. The role of octanoic and decanoic acid in ethylene sensitivity during pollination-induced senescence of *Petunia hybrida* flowers. *Acta Horticulturae* 261:151-156.

Whitehead, C.S. and A.H. Halevy. 1989. Ethylene sensitivity: The role of short-chain saturated fatty acids in pollination-induced senescence of *Petunia hybrida* flowers. *Plant Growth Regulation* 8:41-54.

Halevy, A.H. and C.S. Whitehead. 1989. Pollination-induced corolla abscission and the role of short-chain fatty acids in the process. In: D. Osborne and M. Jackson (eds), *Cell Separations in Plants*. NATO ASI Series, Vol. H 35. Springer Verlag, Berlin.

Strydom, G.J. and C.S. Whitehead. 1990. The effect of ionizing radiation on ethylene sensitivity and postharvest ripening of banana fruit. *Scientia Horticulturae* 41:293-304.

Van Wyk, B-E. and C.S. Whitehead. 1990. The chemotaxonomic significance of prunasin in *Buchenroedera*. *S.A. Journal of Botany* 56:68- 70.

Whitehead, C.S. and C.J. Steenkamp. 1990. The effect of nitrogen and manganese on the aroma of flue-cured tobacco. *S.A. Journal for Plant and Soil* 7: 32-35.

Whitehead, C.S. and C.A. Bossé. 1991. The effect of ethylene and short-chain saturated fatty acids on

ethylene sensitivity and binding in ripening bananas. *Journal of Plant Physiology* 137: 358-362.

Whitehead, C.S. and R. Nelson. 1992. Ethylene Sensitivity in germinating peanut seeds: The effect of short-chain saturated fatty acids. *Journal of Plant Physiology* 139: 479-483.

Botha, M.L. and C.S. Whitehead. 1992. The effect of polyamines on ethylene synthesis during normal and pollination-induced senescence of *Petunia hybrida* L. flowers. *Planta* 188: 478-483.

Van Wyk, B.E., Whitehead, C. S., Glen, H., Hardy, D.S., Van Jaarsveld, E.J. and G.F. Smith. 1993. Nectar sugar composition in the subfamily Alooideae (Asphodelaceae). *Biochemical Systematics and Ecology* 21: 249-253.

Whitehead, C.S. and D. Vasiljevic. 1993. Role of short-chain saturated fatty acids in the control of ethylene sensitivity in senescing carnation flowers. *Physiologia Plantarum* 88. 243-250.

Whitehead, C.S. 1994. Ethylene sensitivity and flower senescence. In: R. J. Scott and A. D. Stead (eds.), *Molecular and Cellular Aspects of Plant Reproduction*. Cambridge University Press, Cambridge, UK. pp 269-284.

Sutcliffe, M.A. and C.S. Whitehead. 1995. Role of ethylene and short-chain saturated fatty acids in the smoke-stimulated germination of *Cyclopia* seed. *Journal of Plant Physiology* 145: 271-276.

Whitehead, C.S. and M.A. Sutcliffe. 1995. Effect of low temperatures and different growth regulators on seed germination in *Cyclopia* spp. *Journal of Plant Physiology* 147: 107-112.

Halevy, A.H., Porat, R., Spiegelstein, H., Borochoy, A., Botha, L. and C.S. Whitehead. 1996. Short-chain saturated fatty acids in the regulation of pollination-induced ethylene sensitivity of *Phalaenopsis* flowers. *Physiologia Plantarum* 97 (3): 469-474.

Whitehead, C.S., Botha, M.L. and A.H. Halevy. 1997. Effect of octanoic acid on ethylene sensitivity in Dutch iris bulbs. *Acta Horticulturae* 340: 89-93.

Botha, M.L., Whitehead, C.S. and A.H. Halevy. 1998. Effect of octanoic acid on ethylene-mediated flower induction in Dutch iris bulbs. *Plant Growth Regulation* 25 (1): 47-51.

Halevy, A.H. and Whitehead, C.S. 1999. The role of short-chain saturated fatty acids in inducing sensitivity to ethylene. In: *Biology and Biotechnology of the Plant Hormone Ethylene*. Kanellis, A.K., Chang, C., Klee, H., Bleeker, A.B., Pech, J.C. and Grierson, D. (eds.). Kluwer Academic Publishers, The Netherlands, pp. 203-207.



Whitehead, C., O'Reilly, L., Weerts, J. and Zaayman, M.M. 2002. Sucrose uptake by senescing climacteric flowers. *S.A. Journal of Botany* 68 (2): 281.

Whitehead, C.S., O'Reilly, L., Weerts, J., Zaayman, M.M. and Gaum, W. 2003. The effect of sucrose pulsing on senescing climacteric cut flowers. *Acta Horticulturae* 599: 549-557.