National Olive Variety Assessment (NOVA) - Roseworthy, Sth. Aust.

Mr. Benjamin Pike [a], Dr. Susan Sweeney [b]

a University of Adelaide, School of Agriculture, Food and Wine, Urrbrae. South Australia

Benjamin.pike@adelaide.edu.au

b South Australian Government, Department for Environment and Water, Adelaide, South Australia

Industry Challenges – late 90's early 2000's

Variety Selection

Best varieties for Australian conditions?

Oil, water, acid, yield, regions?

Varietal Identity

Mistaken identities, confusion and uncertainty

Cross pollination issues

Tentative investment

Solution

NOVA Project

Research site

National commercial assessment

THE UNIVERSITY of ADELAIDE

Personnel - Organisations

Staff

Susan Sweeney Project Lead (PIRSA-SARDI)

Ray Correll, project statistician, CSIRO

Advisors: Gerry Davies, Shimon Lavee, Michael Burr, Ricardo Gucci

Site Management: Ian Nuberg, Tina Gretch, Louis Marafioti, Peter Cox

HVO Team: Margaret Sedgely, Graham Jones, Jenny Guerin, Michelle Wirthensohn, Kate Delaporte

Misc. Govt Departments: Dick Taylor (Dept of Ag WA), Karen Butler (DPI, Water and Env Tas)

Contributors

Olive Growers

Nurseries

Funding

Rural Industries Research and Development Corporation (RIRDC-AgriFutures)

Primary Industries and Resources South Australia (PIRSA)

Australian Olive Association (AOA)

University of Adelaide

Agrolive Pty Ltd

THE UNIVERSITY of ADELAIDE

Results NOVA Collection - 2001-2003

DNA Fingerprinting

Significant Confusion

100 accessions

55 Genotypes

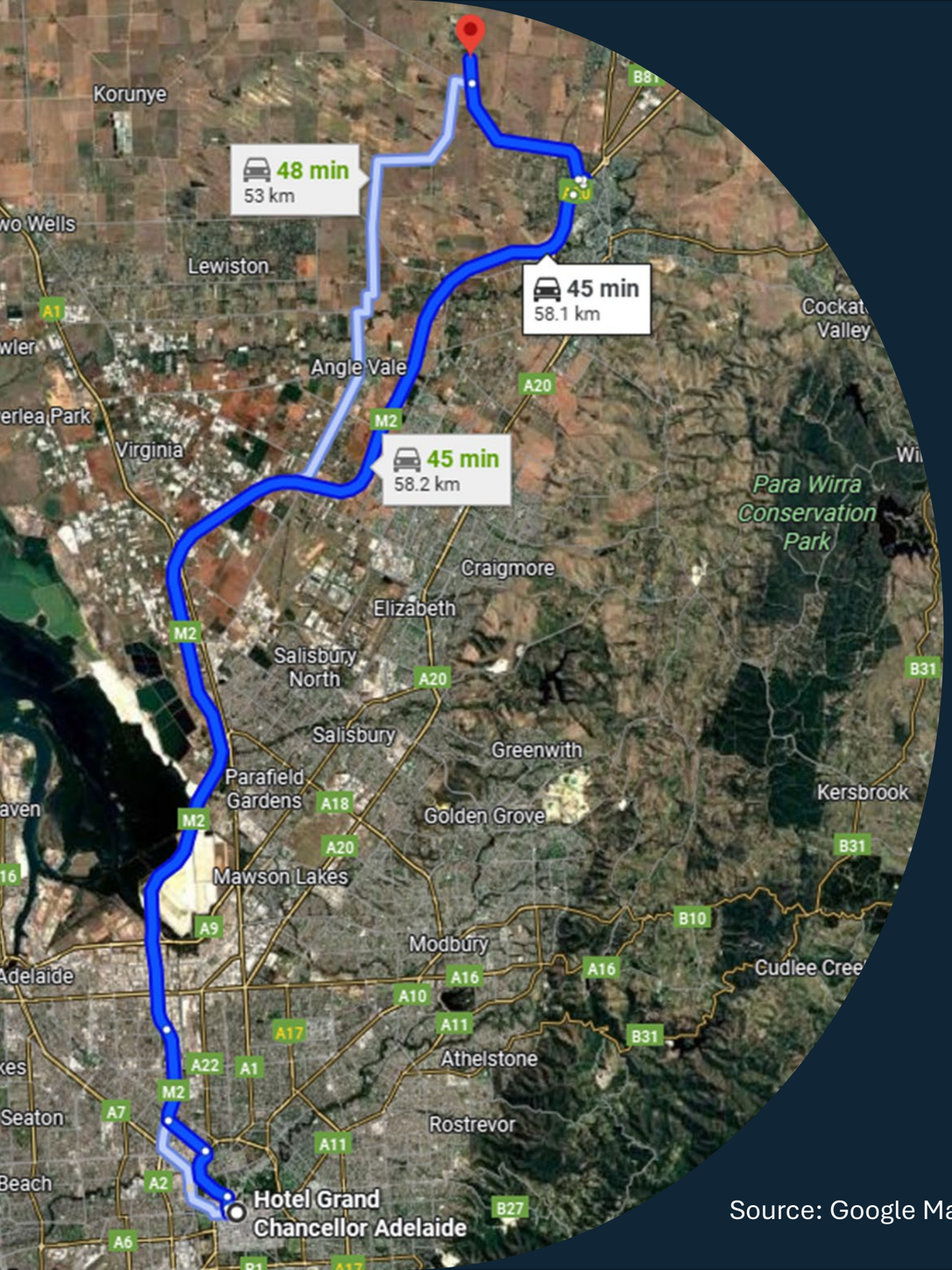
Variety Confirmation

12 differently named varieties were genetically identical to Frantoio.

Arbequina, Barnea, Coratina, Frantoio, Hojiblanca, Kalamata, Koroneiki, Leccino, Manzanilla de Sevilla, Nevadillo Blanco, Pendolino, Picual, Sevillano, Souri and one Verdale type.

THE UNIVERSITY of ADELAIDE

The NOVA Project



Source: Google Maps (2025)

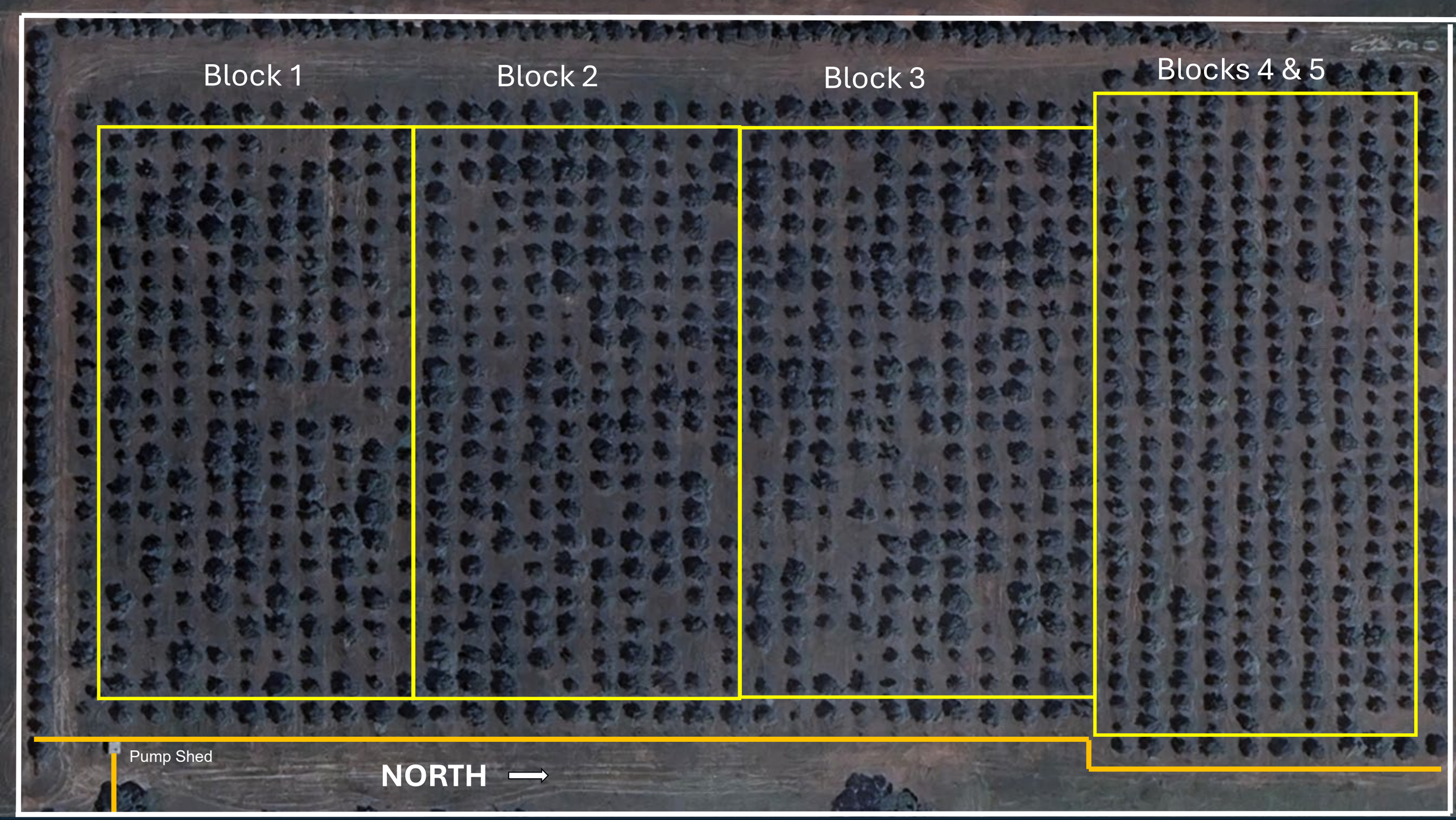
National Olive Collection

- Planted in stages during 1998 – 1999
- Replicated trial with 55 genotypes
- Three blocks of the known varieties randomly distributed
- Two blocks of feral accessions accessions

Commercial Evaluation

- Fruit samples from growers growers across Australia (2000-2004)
- Regions classified by agro-climatic indices

- Evaluate quality parameters of parameters of known and feral varieties
- Analysis of fatty acid profiles profiles and fruit characteristics


Block 1
Block 2
Block 3
Blocks 4 & 5
Pump Shed
NORTH

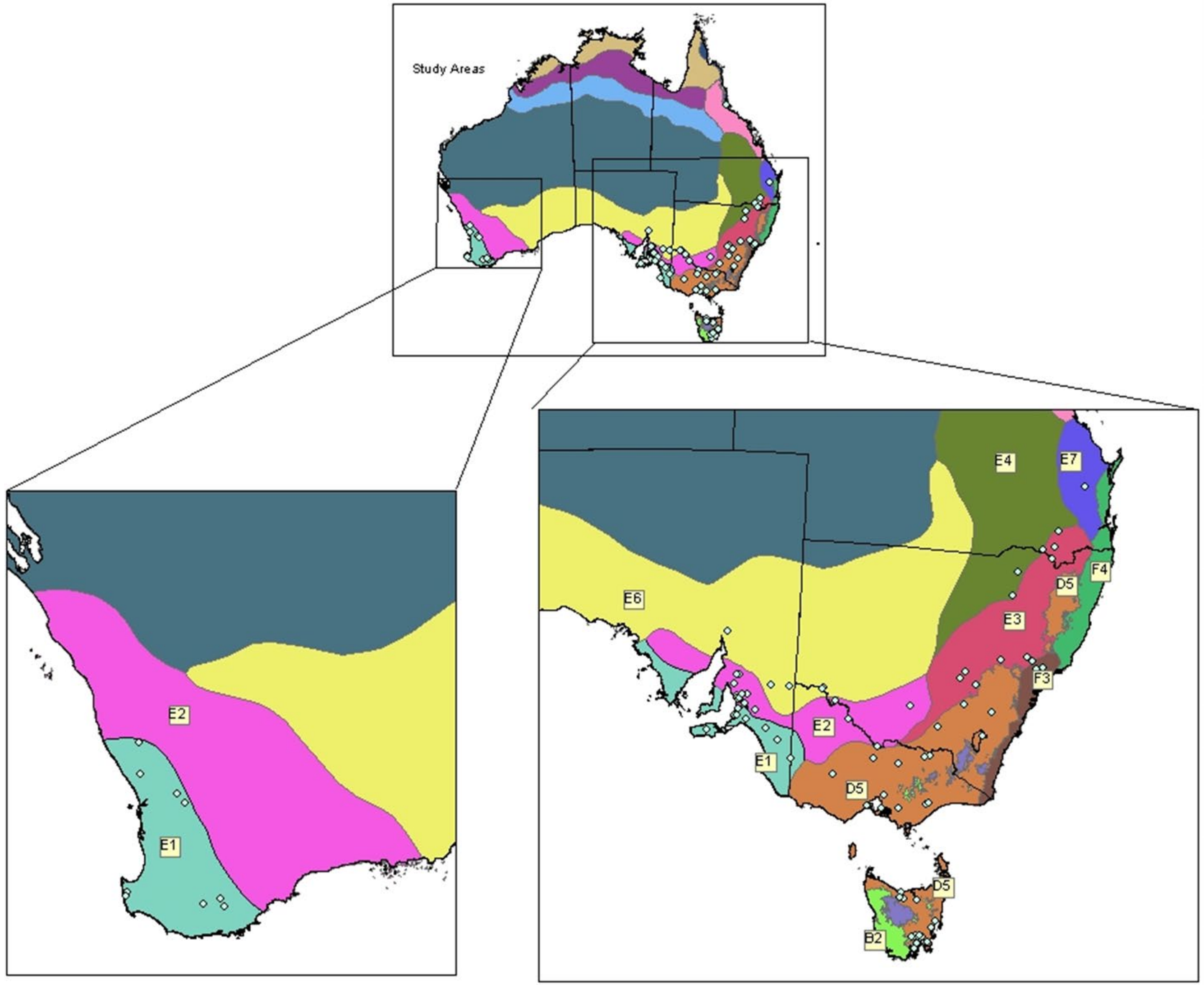
Genotype #	Cultivar Name	NOVA #'s	Synonyms from NOVA	Genotype #	Cultivar Name	NOVA #'s	Synonyms from NOVA
1	Frantoio	1, 13, 26, 29, 40, 46, 49, 52, 57, 66, 68, 72, 80, 86, 95	Corregiola, Paragon, Emu Flat, Mediterranean, Belle de Espagne, Boothby's Lucca, Pueblana, Bouteillon, Palsano, Frantoja, Leccure, Lucca.	28	Atroviolacea Brun Ribier	38	
2	Picual	2, 12, 96		29	Arbequina	5, 41, 99	Big Spanish
3	Barnea	3, 97		30	Black Italian (BEO)	42	
4	Manzanillo	4, 16, 98		31	Blanquette	43, 89	Rubra Baillon d'Aise
5	Leccino	6		32	Blanquette Early	44	
6	Pendolino	7		33	Bouquettier	45, 48, 92	Verdale (NSW), Blanquette Late
7	Hojiblanca	8, 100		34	Buchine	50	
8	Coratina	9		35	Columella	51	
9	Mission (WA)	10		36	Del Morocco	54, 75	O' de Grasse
10	177	11		37	Dr Fiasci	55	
11	Manaiki	14		38	FS17	58	
12	Barouni	15		39	Hardy's Mammoth	60, 61, 69, 90, 91	Gros Reddeneau, Marchiosa, Salome, Tarascoa.
13	Sevillano	18, 19, 53.	Nab Tamri, Cucco.	40	Institute	62	
14	UC13A6	20		41	Large Pickling	65	
15	Verdale (SA)	17, 21, 24	Mission, Black Italian.	42	Mission	39, 71	Attica
16	Azapa	22		43	Nevadillo Blanco	74	
17	Benito	23		44	Oblitza	76	
18	Jumbo Kalamata	25		45	Oblonga	56, 78	Frantago
19	Queen of Spain	27		46	Palermo	63, 64, 79	Large Fruited, Large Fruiting
20	Kalamata	30		47	Pendulina	81	
21	Katsourela	31		48	Picholine	47, 59, 67, 73, 82	Borregiola, Gaeta, Morihoso, Longue d'Ascoli.
22	Koraneiki	28, 32	Wallace	49	Pigale	83	
23	Souri	33		50	Praecox	85	
24	Amelon	34		51	Regalise de Languedoc	87	
25	Areccuzo	35		52	Rouget	88	
26	Ascolano	36		53	Verdale (BEO)	93	
27	Atro Rubens	37		54	Volos	94	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
7	29	29	4	4	3	3	2	2	1	1	29	29	4	4	3	3	2	2	1	1	29	29	4	4	3	3	2	2	1	1	7
1	17	24	48	46	27	5	31	1	40	1	6	2	31	33	39	7	22	37	1	27	27	39	1	33	46	42	15	39	50	2	29
1	17	24	48	46	27	5	31	1	40	1	6	2	31	33	39	7	22	37	1	27	27	39	1	33	46	42	15	39	50	2	29
2	47	39	15	1	31	53	44	28	1	46	33	47	47	48	43	52	1	36	23	17	48	34	23	3	1	30	41	25	1	2	4
2	47	39	15	1	31	53	44	28	1	46	33	47	47	48	43	52	1	36	23	17	48	34	23	3	1	30	41	25	1	2	4
3	23	1	39	10	1	29	42	18	2	1	4	32	1	39	3	26	19	48	10	46		1	45	7	47	13	18	22	46	48	3
3	23	1	39	10	1	29	42	18	2	1	4	32	1	39	3	26		48	10	46		1	45	7	47	13	18	22	46	48	3
4	33	22	12	4	6	46	13	45	41	21	45	33	28	1	34	1	50	4	18	1	46	2	7	22	29	17	28	26	15	42	2
4	33	22	12	4	6	46	13	45	41	21	45	33	28	1	34	1	50	4	18	1	46	2	7	22	29	17	28	26	15	42	2
29	36	1	54	48	37	39	3	4	1	29	13	51	44	1	7	1	47	3	42	31	4	36	5	14	31	1	13	21	10	51	1
29	36	1	54	48	37	39	3	4	1	29	13	51	44	1	7	1	47	3	42	31	4	36	5	14	31	1	13	21	10	51	1
1	48	15	36	39	33	48	1	1	11	25	41	7	1	11	13	29	38	1	2	40	47	48	48	39	13	49	29	39	1	40	29
1	48	15	36	39	33	48	1	1	11	25	41	7	1	11	13	29	38	1	2	40	47	48	48	39	13	49	29	39	1	40	29
2	43	42	2	3	39	13	7	34	13	35	22	8	39	15	42	14	1	1	1	24	4	15	1	38	1	33	20	31	1	43	4
2	43	42	2	3	39	13	7	34	13	35	22	8	39	15	42	14	1	1	1	24	4	15	1	38	1	33	20	31	1	43	4
3	47	8	15	32	2	20	51	33	7	45	12	15	15	36	2	4	49		39	48	33	24	35	44	1	48	52	19	1	12	3
3	47	8	15	32	2	20	51	33	7	45	12	15	15	36	2	4	49	54	39	48	33	24	35	44	1	48	52	19	1	12	3
4	1	1	49	19	22	9	47	50	38	16	21	45	46	25	35		16	29	1	1	3	39	36	16	53	1	6	8	1	29	2
4	1	1	49		22	9	47	50	38	16	21	45	46	25	35	48	16	29	1	1	3	39	36	16	53	1	6	8	1	29	2
29	52	14	4	26	7	30	1	1	29	48	46	20	53	48	13	30	9	39	29	5	1	4	45		47	7	9	37	1	11	1
29	52	14	4	26	7	30	1	1	29	48	46	20	53	48	13	30	9	39	29	5	1	4	45	32	47	7	9	37	1	11	1
7	1	1	2	2	3	3	4	4	29	29	1	1	2	2	3	3	4	4	29	29	1	1	2	2	3	3	4	4	29	29	7

PUMP
SHED

NORTH

THE UNIVERSITY of ADELAIDE



From: Hutchenson et al., (1992); Hutchenson et al., (2005)

Agro -climatic code	Description
D5	Cool wet
E1	Classic “Mediterranean” climate
E2	“Mediterranean” climate, but with drier cooler winters
E3	Most plant growth in summer, Temperature limits growth in winter.
E4	Growth is limited by moisture rather than temperature
E6	Semi-arid climate
E7	Moisture is the main limit on crop growth.
F3	Cooler end of the sub-tropical climates
I3	Strongly developed wet and dry seasons

Results NOVA Collection & Commercial Evaluation - 2001-2004

Flowering & Harvest Dates

Fruit Yields

Fruit Analysis

- Oil content in dry flesh
- Fruit Weight
- Water in whole fruit

Fruit Analysis cont.

- Flesh to pit ratio
- Fatty acid composition
- Monounsaturated: Oleic and Palmitoleic acids
  Polyunsaturated: Linoleic and Linolenic acids
  Saturated: Palmitic and Stearic acids
- Fruit characteristics

  Effect of tree age

  Effect of maturity

THE UNIVERSITY of ADELAIDE

Where are we now?

Intervening Years

2004 – 2019

2019 – 2025

2020, 21, 22 Harvests

Student involvement

Olives SA

Resurrection

“Holding” maintenance

Workshops

Key Issues

Irrigation

Pruning

P & D Management

Ecosystem

THE UNIVERSITY of ADELAIDE

Where to from here?

Business Plan: Oil sales; some table olives; Revenue for management costs

School of Ag, Food and Wine: Maintenance; Co-funding - reserach; Student internships for Ag Science students; Ag Science/Viticulture/Food Science courses

THE UNIVERSITY of ADELAIDE

Research Questions?

- How do we improve Olive lace bug control – native predators/habitats for IPDM?
- How to use drone pesticide/weed control – emerging technologies.
- Can we assess UniSA/UofA (AU) table olive assessments
- Can we improve canopy management and irrigation strategies - mitigate heat stress and water scarcity without compromising oil quality
- What are the minimum water requirements for maintaining yield and oil quality under hotter and drier conditions?
- Which irrigation technologies (e.g. regulated deficit irrigation, sensor-based scheduling, subsurface systems) deliver the best water use efficiency for olives?
- How can olive groves be integrated into wider landscape resilience planning (e.g. windbreaks, biodiversity corridors, fire risk mitigation)?
- What role can olives play in carbon farming and ecosystem service markets?
- How do different management systems (intensive vs low input) perform in terms of carbon sequestration, resilience, and profitability under climate change?
- International collaborations – E.G. University of Trás-os-Montes and Alto Douro (Portugal)

THE UNIVERSITY of ADELAIDE

References

Bureau of Meteorology (2025). Roseworthy climate statistics, https://www.bom.gov.au/climate/averages/tables/cw_023122.shtml [Accessed 9th October 2025]

Guerin JR, Sweeney SM, Collins GC, Sedgley M (2002) The Development of a Genetic Database to Identify Olive (*Olea europaea* L.) Cultivars. Journal of American Society for Horticultural Science 127(6), 977-983.

Hort Innovation (2024) https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/ [Accessed 9th October 2025]

Hutchinson M, McIntyre S, Hobbs R, Stein J, Garnett S, Kinloch J (2005) Integrating a global agro-climatic classification with bioregional boundaries in Australia. Global Ecology and Biogeography, 14, 197–212

Hutchinson, MF, Nix HA, McMahon, JP (1992). 'Climate constraints on cropping systems.' In: Pearson, CJ (ed) Field Crop Ecosystems of the World, Elsevier, 37-58.

Sweeney S, (2005) National Olive Variety Assessment Project Stage II Final Report. Rural Industries Research and Development Corporation. 05-155.pdf (agrifutures.com.au)

Sweeney S, Butler K, Conlan D, Correll R, Jones G, McClure P, Taylor R (2002) A survey of selected oil composition and fruit characteristics in different olive varieties across Australia. Advances in Horticultural Sciences 16 (3-4):253-258

THE UNIVERSITY of ADELAIDE

Acknowledgements

Sue Sweeney

Michelle Wirthensohn

Olives SA

- Michael Johnstone (dec)
- Michael Harbison

Elizabeth Bouzoudis

Michael Southan

Paul Miller

John Matheson – RW farm

THE UNIVERSITY of ADELAIDE

make history.

THE UNIVERSITY of ADELAIDE