Chapter 15
Potato Production in Tasmania, Australia – An Overview of Climate, Soils and Practices

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Abstract Tasmania is an important potato production area of Australia. Its unique combination of climate and soils help determine the scale of operations and shape the diverse farming system practiced by growers. This chapter briefly describes Tasmania's geography, the farming systems of which potato production is part, and introduces some of the management challenges facing the industry, which are the subjects of further discussion in Chaps. 16–19.

15.1 Tasmania, Australia – Its Geography and Its Potato Industry

The island of Tasmania lies off the south east of mainland Australia (Fig. 15.1), and is its smallest state by both area (7 million ha or 0.9%) and population (0.5 million or 2.3%). At latitude spanning 40 to 42 degrees south, Tasmania lies in the path of westerly wind patterns commonly known as the Roaring Forties, and enjoys a cool-temperate climate with mean annual temperature of 9°C in the central highlands and 13°C nearer the coast. Agriculture, including potato production, is predominantly confined to landscapes below 300 m altitude in the north and central east of the state, where annual rainfall is between 600 and 1,000 mm, snowfall is extremely rare, and frosts are generally confined to the winter months of June to August (Fig. 15.2). Potatoes are usually grown in the period October to March.

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Z. He et al. (eds.), *Sustainable Potato Production: Global Case Studies*,
DOI 10.1007/978-94-007-4104-1_15,

Fig. 15.1 Map of Australia showing its island state of Tasmania

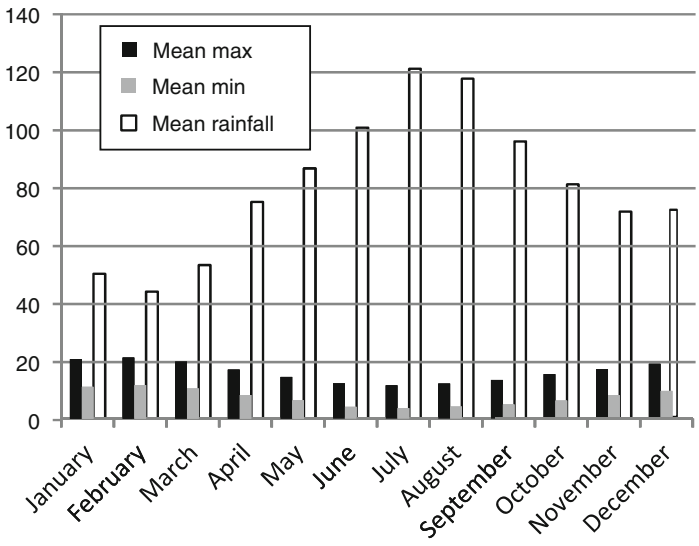

Fig. 15.2 Mean monthly maximum and minimum temperatures (°C, 1966–1996) and rainfall (mm, 1966–2010) for Forthside Research Station in northern Tasmania (lat. 41.2°S; long. 146.3°E)

Potato production in Tasmania is small by global standards, about 300,000 tonnes annually. However, it is the most valuable vegetable crop produced in the State, and constitutes about 25% of Australian potato production (ABS 2010). The crop has been grown ever since European settlement in the nineteenth century and until about 50 years ago comprised mainly fresh potatoes for export to Sydney, Australia's largest city (DPIWE 2003). Since then, French fries have steadily displaced fresh potatoes to the point where the former now constitute about 80% of total production, with

only about 10% for the fresh market and 10% for seed (DPIW 2009). Russet Burbank remains the dominant cultivar, grown by almost 80% of producers (Sparrow 2009) and accounting for about 60% of total production. Over the years, the advent of improved practices, particularly irrigation and mechanized planting and harvesting in the 1950s, has seen average processing potato yields increase to 49 Mg/ha in 2008/09 (ABS 2010).

15.2 Pests and Diseases

The relative geographic isolation of Australia means that it enjoys freedom from some potato pests and diseases common in other countries. The Australian potato industry does not currently have to contend with Colorado potato beetle (*Leptinotarsa decemlineata* (Say)), tuber flea beetle (*Epitrix tuberis* Gentner), tomato-potato psyllid (*Bactericera cockerelli* (Sulc)), the A2 mating strain of late blight (*Phytophthora infestans* (Mont.) de Bary), potato wart (*Synchytrium endobioticum* (Schilb.) Percival) or pale potato cyst nematode (*Globodera pallida* (Stone) Behrens). Being an island state of Australia, Tasmania also enjoys freedom from golden potato cyst nematode (*Globodera rostochiensis* (Wollenweber)) and potato virus Y which are found in other Australian states.

As well as being free of certain pests and diseases, in Tasmania the climate and isolation tend to moderate the impact of some of the pests and diseases that are present. This means that, for example, the number of insecticide applications to control insect pests is generally less than for crops in mainland Australia, Europe or North America.

While Tasmanian potato growers face fewer pest and disease challenges than many of their overseas counterparts, soil-borne diseases such as common and powdery scab (caused by the pathogens *Streptomyces scabiei* and *Spongospora subterranea*), as well as black scurf and stem canker (*Rhizoctonia solani*) can be significant problems. Chapters 18 and 19 describe Tasmanian research into the management of these diseases.

15.3 Soils and Land

The major soils used for potato production in Tasmania are known as Red Ferrosols in the Australian Soil Classification (Isbell 2002) or Humic Eutrodox in Soil Taxonomy (Soil Survey Staff 2006). These are deep, well structured, clay loam soils formed on Tertiary basalt flows, with organic carbon contents of 3–6% in the surface horizons. They occur in a rolling landscape where slopes are commonly 5–15% and can be as much as 25%. Water erosion is a significant threat. Other important potato growing soils include Dermosols or Udic Kanhaplustults, which are soils

with structured B2 horizons and which lack strong texture contrast between the A and B horizons, Sodosols or Udic Haplustalfs, which are light textured topsoils overlying heavy clay at depths of 300 to 500 mm, and Tenosols or Humic Dystroxerepts, which are deep, windblown sands. These occur on broader plains and river valleys where poor drainage and wind erosion can limit production. The range of potato soils in Tasmania is therefore large, and is reflected in the range of practices required to maintain their physical, chemical and biological fertility. Tasmanian research on the impacts of potato production on soil health, and on the management needed to minimize these impacts, is presented in Chaps. 16 and 17.

15.4 Farmer and Farm Characteristics and Practices

A recent Tasmanian survey of 74 potato growers, about 20% of the Tasmanian potato grower population (Sparrow 2009), showed that most growers are middle-aged, experienced, owner-operators, with 52% between 41 and 60 years old, more than two-thirds having greater than 10 years experience growing potatoes, and over 70% owing all of their potato growing land. Most growers operate on a relatively small scale, with an average annual potato area of 22 ha and two-thirds of farmers growing 6–20 ha of potatoes each year. Tasmanian potato growers are involved in a variety of other agricultural enterprises (Fig. 15.3), with about a third operating five other enterprises. Grazing was one other enterprise for 82% of Tasmanian growers.

Tasmanian potato growers have a significant diversity of crops in their rotation with about 30% growing three or more other crops (Fig. 15.4). This diversity provides breaks for disease management and varied intensity of machinery use. Poppies (*Papaver somniferum* L.) for pharmaceuticals and cereals were the most popular alternate crops, followed by a number of vegetables (Fig. 15.5). The average time between successive potato crops in the same paddock was 6.1 years (Fig. 15.6), with a maximum rest period of 11 years and 90% of growers having 5 or more years

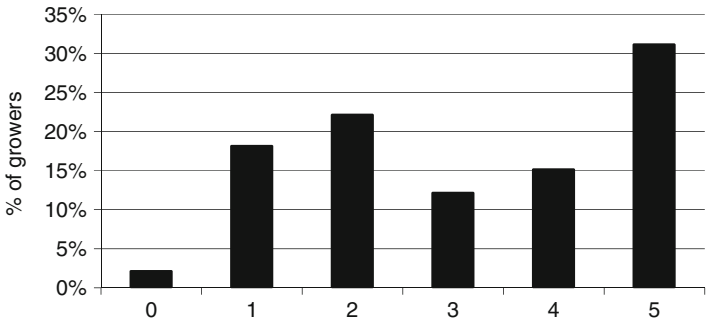

Fig. 15.3 Number of agricultural enterprises other than potatoes operated by Tasmanian growers

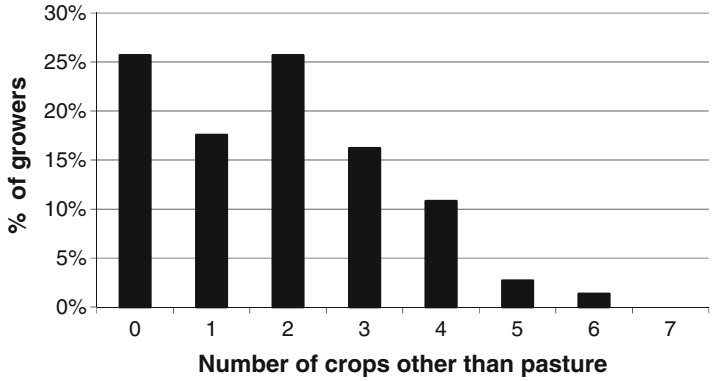

Fig. 15.4 Diversity of crops other than pasture in Tasmanian growers' rotations

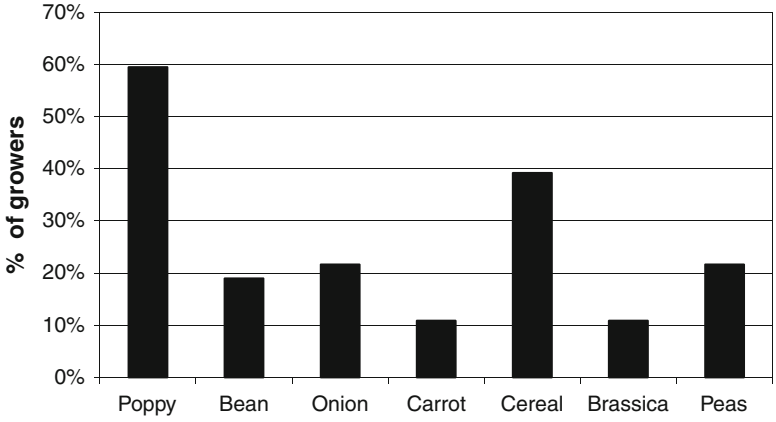

Fig. 15.5 Presence of crops other than potatoes in Tasmanian rotations

Fig. 15.6 Presence of pasture in Tasmanian potato rotations

between successive plantings. Tasmanian potato rotations are thus considerably longer and more diversified than those in many other areas of the world, including North America (Carter et al. 2009; Griffin et al. 2009; Po et al. 2009) and Europe (Van Loon 1992), where intervals of 3 years or less are common and where cereals predominate as other rotation crops. About two-thirds of Tasmanian growers included at least 3 years of pasture in their rotations (Fig. 15.6).

15.5 Challenges for a Sustainable Industry

The Tasmanian potato industry is somewhat unique globally because, despite its small scale, it comprises a variety of land, soil and rotation combinations. These combinations present particular challenges to both researchers and farmers. Chapters 16–19 provide more fully-developed descriptions of these challenges and how recent research and development efforts have helped Tasmanian potato growers to meet them.

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