QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES
DIVISION OF PLANT INDUSTRY BULLETIN No. 485

POTATO VARIETY TRIALS IN SOUTH-EASTERN QUEENSLAND

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SUMMARY

A number of potato varieties were tested during 1962-1967 in February and July plantings on alluvial clay soils at the Gatton Research Station under growing conditions representative of those found in the major potato districts of south-eastern Queensland.

While the overall results indicate the superior yielding potential of Sequoia and the more recently developed varieties Bungama and Kurrel, certain external and internal quality aspects, in particular culinary ones, detracted from their consumer value. When considering the requirements of both producers and consumers, Sebago proved to be the most acceptable variety, well suited to the heavy soil types during both spring and autumn seasons, followed by Kennebec for July plantings alone. The culinary quality of these varieties is of a multi-purpose nature and both are well suited to commercial chipping.

Susceptibility to scab reduced the value of Pontiac. This variety, which is capable of satisfactory yields, particularly in autumn, and produces tubers of a very acceptable boiling/mashing quality, could well be considered increasingly in cases where russet scab is not a limiting factor.

I. INTRODUCTION

Annual potato production in Queensland during the period 1963-1965 averaged 90,000 tons, of which some 55,000 tons were produced in spring and 17,000 tons in autumn. The main production was on alluvial clays and clay loams in the Lockyer and Bremer-Fassifern districts. The autumn crop is defined as the crop from plantings between late January and early March; the spring crop is derived from plantings between early July and early August.

The soil types in the main areas vary from heavy to very heavy, well-structured dark clay loams and clays with a predominantly neutral to slightly alkaline reaction. The soils are specially rich in calcium, magnesium and phosphorus, and potassium is in reasonably good supply in most.

All potato crops are produced under irrigation and are short term (95-120 days), the growing period being slightly longer in midwinter than in midsummer

plantings. Temperatures and light intensities are high, day length is short and climatic conditions are extremely variable. Rainfall is erratic and often of a torrential nature. Some meteorological data are given in Table 1.

TABLE 1

METEOROLOGICAL DATA FOR GATTON RESEARCH STATION
(Latitude 27° 33′ S.)

—	Mean Maximum* (°F)	Mean Minimum* (°F)	Mean Hourly† (°F)	Rainfall‡ (in.)
January	85·5	65·7	74·5	4·32
February	86·3	65·8	74·0	3·39
March	83·9	63·3	72·0	3·22
April	79·4	56·1	67·1	1·90
May	74·0	49·5	60·5	1·53
June	69·5	44·9	56·4	1·73
July	68·4	42·9	54·6	1·45
August	71·7	43·5	56·4	1·05
September ..	75·7	47·9	62·3	1·50
October	81·4	55·2	68·3	2·46
November ..	82·8	60·6	72·0	2·89
December ..	87·2	63·6	73·8	3·92

* Average of 33 years
† Average of 5 years
‡ Average of 65 years

High production costs, wide price fluctuations and a marked premium for earliness, particularly in spring, have favoured commercial production of "new" potatoes, i.e. tubers with slightly immature skin and weighing more than 2 oz. Producers therefore prefer early-maturing or quick-bulking varieties and the emphasis is on earliness and quantity.

Potatoes produced in Queensland are marketed mainly for table use. Increasing quantities are, however, being utilized by local and southern processors for crisping.

Sebago is the main commercial variety, comprising some 70% of the plantings. Sequoia, Bungama and Kurrel are being increasingly used, particularly in April-June plantings, while a few farmers plant Kennebec and Pontiac.

To obtain a better understanding of the merits and demerits of the present commercial varieties and of new varieties, a series of varietal trials was carried out during 1962-1967.

II. MATERIALS AND METHODS

Treatments were replicated four times with plot size varying between 50 and 100 ft row length. A uniform plant spacing of 12 in. and a row spacing of 34 in. were adopted. Run-grade certified seed (1¼-8 oz) obtained from New South Wales and Victoria was used for July plantings, cut to 1½-2½ oz seed pieces

(average 2 oz), making 0·86 ton planting material per acre, except where otherwise mentioned. The seed for February plantings was of equal weight and derived from the previous July general planting. It was cut only when the varietal characteristics of size distribution would have precluded the commercial production of small round seed during spring. This was mostly the case with Kennebec.

The soil type was a fertile, well-structured, deep alluvial clay representative of the commercial potato areas. Fertilizer of the order of 2-3 cwt of complete fertilizer (10-7-10)/ac, with potash as potassium sulphate, was applied as a basal dressing, followed by 1-2 cwt of sulphate of ammonia as a side-dressing at plant emergence. Routine pest and control measures were adopted, mainly aimed at control of potato tuber moth (*Gnorimoschema operculella*) and target spot (*Alternaria solani*). Regular spray irrigations of approximately 1-1¼ in. per week ensured adequate soil moisture.

The potatoes were harvested mechanically. Tubers from each plot were bagged as bulk in the field and later graded and weighed.

Yield data were determined on the basis of weight of tubers greater than 2 oz for New grade and greater than 3 oz for commercial No. 1 grade. To allow an easier comparison between varieties, the essential difference between these grades, that of a mature or immature skin, was not taken into account at harvesting.

The average specific gravity of tubers from each plot was determined with a potato hydrometer, using 3-8 oz tubers. The specific gravity characteristic of the varieties was determined over 50 of these tubers by means of brine solutions of different strength (Lugt 1960).

For comparison of varieties, individual tubers were selected with a specific gravity equal to the mean of four plots as indicated by the potato hydrometer readings. The total solid matter content where stated was derived from the specific gravity value by means of Von Scheele's regression equation (Murphy and Goven 1959).

III. RESULTS

Yield.—Yield data on tubers of greater than 2 oz and greater than 3 oz weight are given in Tables 2 and 3 respectively. These classes included tubers which would normally be rejected by farmers on account of greenness or second growth, an average percentage for which is given in Table 6. Because of the wide range in the number of seasons in which the individual varieties were tested, it is not practicable to rate varieties in order of yield. Bungama, Sequoia and Kurrel were amongst the best-yielding varieties during both seasons and Pontiac during the autumn season.

Size distribution.—As shown in Table 4, the percentage of marketable tubers greater than 3 oz weight was consistently high in Kennebec during both seasons, and in Pontiac, Jala and Bungama during autumn. The mean tuber weights indicated a tendency to large tubers for Kennebec, Sequoia, Bungama, Jala and Kurrel during autumn.

TABLE 2

YIELD IN TONS PER ACRE > 2 OZ TUBER WEIGHT

—	1962*	1963	1964	1965	1966	1967	Means
			Autumn Season—February-June				
Sebago	13·44	11·05	8·44	6·53	8·47	7·51	9·24
Sequoia	14·04	12·77	8·65	7·92	..	9·07	10·49
Kennebec	13·00	11·08	8·91	3·72	..	7·37	8·82
Pontiac	..	12·19	10·52	9·04	10·49	10·09	10·47
Bungama	13·78	12·90	6·46	5·27	..	..	9·60
Kurrel	..	11·65	12·10	8·27	..	..	10·67
Redskin	..	..	8·67	6·48	9·74	..	8·29
Exton	..	..	..	6·31	..	..	6·31
Jala	..	8·43	..	..	..	..	8·43
Royal Red Craig	..	..	..	..	..	6·39	6·39
Red Beauty	..	..	6·22	..	..	..	6·22
Brownell	..	..	..	4·82	..	..	4·82
Necessary differences for significance 1%	No sig.	1·87	..	1·57	0·90	1·59	..
Necessary differences for significance 5%	diff.	1·37	..	1·16	0·64	1·13	..
			Spring Season—July-November				
Sebago	9·89	12·33	10·27	10·04	10·13	10·40	10·51
Sequoia	10·26	13·67	11·54	11·93	10·31	..	11·54
Kennebec	9·40	11·68	10·95	11·04	9·62	8·43	10·19
Pontiac	8·95	8·97	12·38	11·18	11·45	11·09	10·67
Bungama	10·71	14·44	12·05	..	..	..	12·40
Kurrel	..	11·26	9·03	..	..	10·37	10·22
Redskin	..	11·04	9·11	11·13	..	..	10·43
Exton	..	..	11·02	..	9·56	9·27	9·95
Jala	6·99	..	..	..	..	..	6·99
Royal Red Craig	..	..	..	..	9·24	5·23	7·47
Red Beauty	..	6·02	..	..	..	..	6·02
Brownell	..	..	10·15	8·55	..	..	9·35
Necessary differences for significance 1%	1·50	..	1·51	1·74	1·35	2·30	..
Necessary differences for significance 5%	1·08	..	1·12	1·27	1·01	1·72	..

* Seed size av. 3 oz whole—1·29 tons/ac.

Diseases and pests.—Some disease ratings taken during the testing period are given as averages in Table 5. Target spot ratings taken after approximately 90 days' growth show a relatively light infestation for the late-maturing varieties Bungama, Sequoia, Kurrel and Exton, in contrast with heavy infections for Pontiac, Royal Red Craig, Kennebec and Sebago. Scab ratings showed that Sequoia, Pontiac and Kurrel are susceptible, more so in autumn than in spring, while Sebago, Kennebec and Bungama had good resistance.

Apart from the data given in Table 5 it was also observed that Bungama was susceptible to soft-rot breakdown as both seed pieces and fully developed

TABLE 3

YIELDS IN TONS PER ACRE > 3 OZ TUBER WEIGHT

—	1962*	1963	1964	1965	1966	1967	Means
			Autumn Season—February-June				
Sebago	12·58	10·28	7·77	5·84	7·82	6·94	8·53
Sequoia	12·20	12·13	7·71	7·36	..	8·39	9·76
Kennebec	12·13	10·70	8·78	3·57	..	7·03	8·44
Pontiac	..	11·71	9·99	8·60	10·05	9·52	9·97
Bungama	13·00	11·95	6·10	4·77	..	..	8·95
Kurrel	..	10·74	11·19	5·41	..	..	9·11
Redskin	..	..	7·89	5·78	9·00	..	7·55
Exton	..	..	..	5·82	..	..	5·82
Jala	..	7·81	..	..	..	..	7·81
Royal Red Craig	..	..	..	..	..	5·42	5·42
Red Beauty	..	..	5·82	..	..	..	5·82
Brownell	..	..	..	3·80	..	..	3·80
Necessary differences for significance 1%	No sig.	1·98	2·27	1·50	0·92	1·71	..
Necessary differences for significance 5%	diff.	1·46	1·87	1·10	0·65	1·22	..
			Spring Season—July-November				
Sebago	8·45	11·42	8·81	8·74	8·43	9·22	9·18
Sequoia	9·29	13·09	10·74	10·16	9·27	..	10·51
Kennebec	8·66	11·38	10·46	9·78	8·57	7·91	9·46
Pontiac	6·68	7·28	10·85	9·25	9·11	10·10	8·87
Bungama	9·33	13·57	10·25	..	..	..	11·05
Kurrel	..	10·60	7·94	..	..	8·55	9·03
Redskin	..	10·50	8·45	9·63	..	..	6·53
Exton	..	..	9·64	..	8·07	..	8·86
Jala	5·15	..	..	..	..	..	5·15
Royal Red Craig	..	..	..	..	8·00	4·51	6·26
Red Beauty	..	5·48	..	..	..	..	5·48
Brownell	..	..	8·27	7·20	..	..	7·74
Necessary differences for significance 1%	1·34	2·03	1·56	1·58	1·45	2·08	..
Necessary differences for significance 5%	0·97	1·50	1·15	1·15	1·09	1·55	..

* Seed size av. 3 oz whole—1·29 tons/ac.

tubers, in the soil and also in storage. Kennebec was more prone to breakdown of tubers in the ground after prolonged wet weather, due to suspected pinkrot (*Phytophthora erythroseptica*), than Sebago or Sequoia. Redskin showed a greater susceptibility to Irish blight than Sebago or Sequoia. The red varieties, Pontiac and Royal Red Craig, appeared to be less affected by potato tuber moth.

Growth characteristics.—Sebago, Bungama and Redskin had shorter average dormancy periods compared with Sequoia, Kurrel and Kennebec.

Tuber characteristics.—Various data are shown in Table 5. Kurrel, Bungama, Kennebec, Jala and Pontiac were, in that order, susceptible to growth cracking

TABLE 4

PERCENTAGE TUBERS AND MEAN AVERAGE WEIGHT TUBERS > 3 OZ

Variety	Percentage Tubers							Mean Average Weight
	1962	1963	1964	1965	1966	1967	Means	1962–1967 (oz)
			Autumn Season—February-June					
Sebago	90·6	92·9	88·8	84·2	86·2	89·7	88·7	6·2
Sequoia	92·1	95·0	84·3	87·9	..	89·8	89·8	7·2
Kennebec ..	91·0	96·6	94·0	92·0	..	93·1	93·3	8·1
Pontiac	..	96·1	93·3	92·0	93·2	91·7	93·2	6·6
Bungama ..	92·2	92·5	92·8	87·0	..	..	91·1	6·9
Kurrel	..	92·1	90·3	82·6	..	..	88·3	6·6
Redskin	..	..	88·4	83·3	87·6	..	86·4	5·8
Exton	..	..	..	88·6	..	..	88·6	6·4
Jala	..	92·7	..	..	..	..	92·7	6·7
Royal Red Craig	..	..	..	..	..	77·9	77·9	5·5
Red Beauty ..	..	..	91·5	..	..	..	91·5	6·3
Brownell ..	..	..	..	65·5	..	..	65·5	5·2
Necessary differences for significance 1%	..	5·2	4·8	..	3·7	7·2	..	
Necessary differences for significance 5%	..	3·8	3·6	..	2·6	5·2	..	
			Spring Season—July-November					
Sebago	80·0	88·3	81·7	81·3	79·1	83·8	82·4	5·2
Sequoia	87·1	93·7	90·7	79·6	86·7	..	87·6	5·8
Kennebec ..	91·3	96·3	91·9	83·8	85·3	90·8	90·0	6·2
Pontiac	68·4	74·4	83·5	75·4	73·5	87·1	77·1	5·0
Bungama ..	82·7	90·3	78·8	..	..	..	83·9	5·9
Kurrel	..	89·2	81·4	..	..	74·4	81·7	6·1
Redskin	..	91·7	89·0	81·8	..	..	87·5	6·3
Exton	..	..	84·3	..	78·4	74·4	79·0	5·5
Jala	66·1	..	..	..	..	..	66·1	5·7
Royal Red Craig	..	..	..	..	82·6	79·0	80·0	4·7
Red Beauty ..	..	84·5	..	..	..	..	84·5	5·7
Brownell ..	..	..	75·5	78·3	..	..	77·0	5·1
Necessary differences for significance 1%	..	3·5	6·0	4·2	7·4	6·2	..	
Necessary differences for significance 5%	..	2·6	4·4	3·1	5·5	4·6	..	

during autumn, while Sequoia, Bungama, Kurrel and Jala showed a tendency to hollow heart. Kennebec, Sequoia, Kurrel, Bungama and Exton have a compact tuber set high in the hill and are prone to greening, particularly during autumn. Kennebec, Bungama and Kurrel showed forms of second growth in autumn.

TABLE 5

PLANT AND TUBER CHARACTERISTICS

Variety	Target Spot at 90–95 days*	Russet Scab Cover (%)	Growth Cracks (%)	Second Growth (%)	Hollow Heart (%)	Greening (%)	Dormancy (weeks)
			Autumn Season—February-June				
Sebago	85	2–5	1–2	Nil	Trace	3–5	7–8
Sequoia	30	10–18	Nil	Nil	1–2	3–7	12–13
Kennebec	80	3–5	4–5	5–6	Trace	10–12	8–9
Pontiac	85	10–15	2–3	1–2	Nil	Trace	9–10
Bungama	25	2–5	4–5	4–5	1	4–6	6–7
Kurrel	25	10–12	6–7	2–3	1	10–15	10–11
Redskin	40	4–7	1–2	1–2	Nil	Trace	7–8
Exton	25	5–7	Trace	Trace	Nil	10–12	10–11
Jala	25	10–20	3–4	Trace	1–2	7–10	9–10
Royal Red Craig	95	7–10	2–3	Nil	Nil	Nil	8–9
Red Beauty	40	7–10	3–4	Trace	Nil	Nil	7–8
Brownell	30	7–10	2–3	2–3	Nil	Nil	8–9
			Spring Season—July-November				
Sebago	20	1–3	Nil	Nil	Nil	1–2	6–7
Sequoia	Nil	7–10	Nil	Nil	Nil	3–5	9–10
Kennebec	20	2–5	Nil	Nil	Nil	7–10	7–8
Pontiac	25	7–10	Nil	Nil	Nil	Trace	8–9
Bungama	Nil	1–2	Nil	Nil	Nil	3–5	5–6
Kurrel	Nil	2–3	Nil	Nil	Nil	5–7	9–10
Redskin..	20	3–5	Nil	Nil	Nil	Trace	6–7
Exton	Nil	3–5	Nil	Nil	Nil	3–5	9–10
Jala	Nil	7–12	Nil	Nil	Nil	Trace	8–9
Royal Red Craig	35	5–7	Nil	Nil	Nil	Nil	8–9
Red Beauty	30	3–5	1	Nil	Nil	Nil	..
Brownell	Nil	3–5	Trace	Nil	Nil	Nil	10–11

* 0·0, No damage; 0·1, 1 lesion per plant; 1·0, 10 lesions per plant; 5·0, about 50 lesions per plant; 25·0, all leaves affected; 50·0, ½ leaf area destroyed; 75·0, ¾ leaf area destroyed; 95·0, only stems green; 100·0, Stems dead or dying.

Specific gravity.—Pronounced variation in specific gravity from season to season collectively and within the same variety is shown in Table 6. The specific gravity distribution of the six most important commercial varieties, as measured during autumn and spring 1964, is shown in Figure 1.

Culinary quality.—General observations on culinary qualities made from 1963 onwards are summarized as averages in Table 7, with an indication of the minimum desirable level of specific gravity for each variety.

IV. DISCUSSION

While the overall results indicate the superior yielding potential of the late-maturing, early-bulking Bungama, Sequoia and Kurrel over the main commercial variety Sebago, certain external and internal quality aspects detract from their

TABLE 6

SPECIFIC GRAVITY

Variety	1962	1963	1964	1965	1966	1967	Means
		Autumn Season—February-June					
Sebago	1·080	1·071	1·075	1·068	1·076	1·072	1·074
Sequoia	1·080	1·072	1·077	1·070	..	1·076	1·075
Kennebec	1·080	1·074	1·078	1·076	..	1·077	1·077
Pontiac	..	1·067	1·072	1·064	1·068	1·071	1·068
Bungama	1·082	1·072	1·077	1·074	..	..	1·076
Kurrel	..	1·071	1·075	1·069	..	..	1·072
Redskin	..	..	1·080	1·072	1·078	..	1·077
Exton	..	..	..	1·072	..	..	1·072
Jala (S2881)	..	1·073	..	..	..	..	1·073
Royal Red Craig	..	..	..	..	..	1·076	1·076
Red Beauty	..	..	1·081	..	..	..	1·081
Brownell	..	..	..	1·073	..	..	1·073
Necessary differences for significance 1%	No sig.	0·004	0·003	0·005	0·006	0·005	..
Necessary differences for significance 5%	diff.	0·003	0·002	0·003	0·004	0·003	..
		Spring Season—July-November					
Sebago	1·075	1·074	1·075	1·070	1·075	1·063	1·074
Sequoia	1·077	1·077	1·086	1·073	1·081	..	1·079
Kennebec	1·078	1·078	1·084	1·076	1·082	1·071	1·078
Pontiac	1·071	1·075	1·071	1·069	1·074	1·061	1·070
Bungama	1·082	1·078	1·085	..	..	..	1·082
Kurrel	..	1·075	1·085	..	..	1·070	1·077
Redskin	..	1·077	1·075	1·072	..	..	1·075
Exton	..	..	1·088	..	1·084	1·072	1·081
Jala (S2881)	1·080	..	..	..	..	..	1·080
Royal Red Craig	..	..	..	..	1·083	1·069	1·076
Red Beauty	..	1·081	..	..	..	..	1·081
Brownell	..	..	1·089	1·080	..	..	1·085
Necessary differences for significance 1%	0·003	0·003	0·005	0·004	0·004	0·003	..
Necessary differences for significance 5%	0·002	0·002	0·004	0·003	0·003	0·003	..

commercial value. A higher percentage of growth cracking, protruding eyebrows or hollow heart is evident in these varieties during autumn. Sequoia and Kurrel are susceptible to russet scab and considerable greening reflects high tuber setting and thus greater proneness to potato tuber moth attack. Furthermore, the culinary quality of these varieties when grown during both autumn and spring on the heavy soil types of south-eastern Queensland seems to be less consistent than, and generally inferior to, that of the current commercial varieties Sebago, Kennebec and Pontiac.

In Table 7 the varieties under test are grouped into four utilization types according to the characteristics found after boiling, a form of classification suggested by the Potato Quality Research working group of the European Association for Potato Research (Lugt, Goodijk, and Gastra-Ubbels 1962).

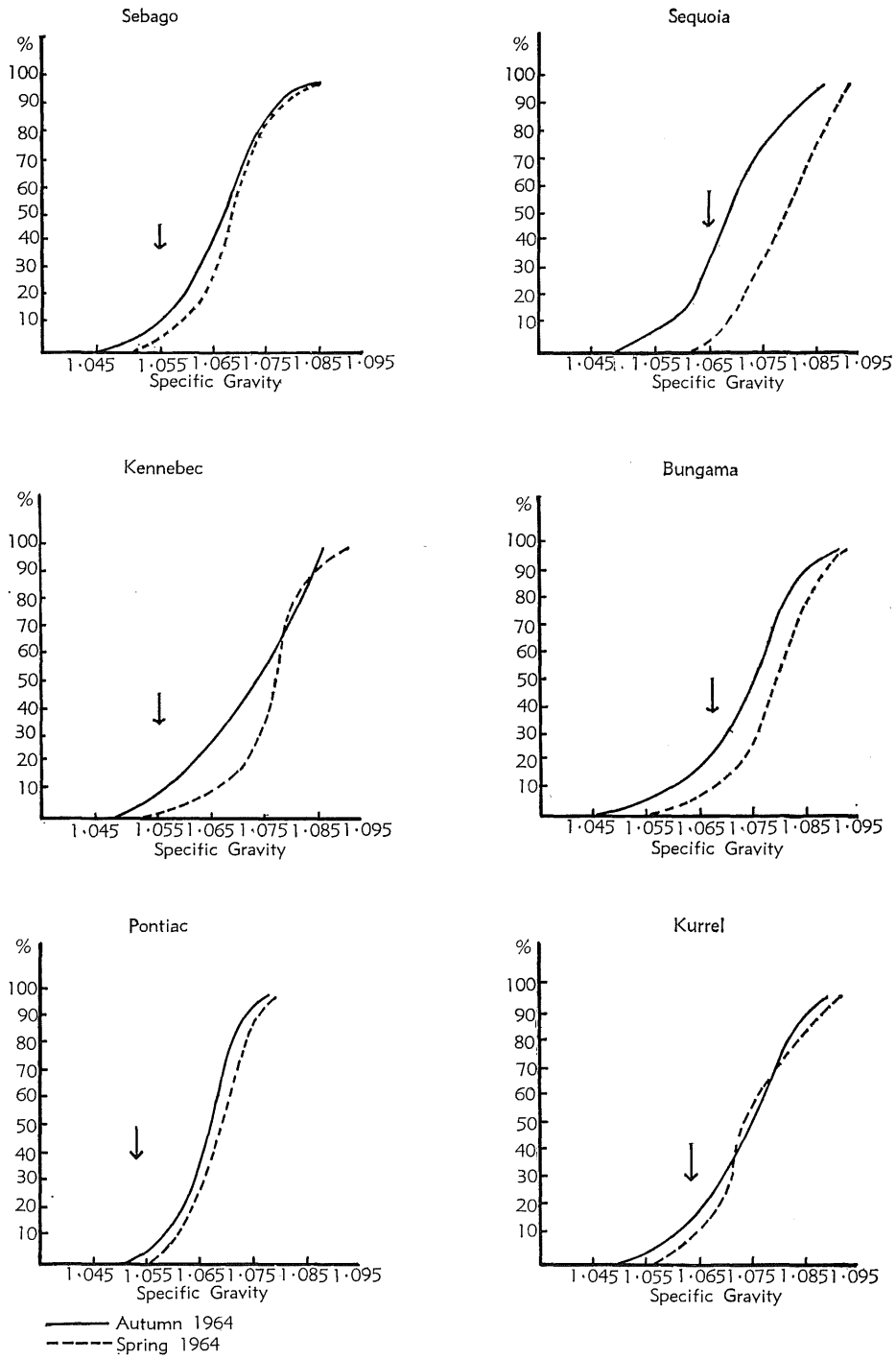

Fig. 1.—Specific gravity characteristics (cumulative percentages).

TABLE 7

CULINARY QUALITIES, 1963–1966

Variety	Range of Solid Matter Observed (%)	Range of Mean Solid Matter (%)	Utilization Type for Mean Solid Matter	Approximate Minimum Acceptable Level Solid Matter (%)	Colour of Flesh	Particulars
Sebago ..	14·5–21·0	18·0–19·0	A–B	15–16	Creamy white ..	Below 17% A type; slight disintegration above 20%; suited for crisp processing, fair for baking and chipping.
Kennebec ..	14·5–22·0	19·0–20·0	B	15–16	Creamy white ..	Below 17% A type; good quality potato, suited to baking, crisp and chip processing.
Pontiac ..	15·0–21·0	17·5–19·0	B	15	White	Medium coarse structure; good boiling and mashing type, not suited to deep frying.
Sequoia ..	14·5–22·5	18·5–20·0	A–B	17–18	Creamy white ..	Quality and flavour inconsistent; not suited to frying.
Bungama ..	14·5–22·5	18·5–20·0	A	17–18	Creamy white ..	Quality and flavour inconsistent; slight after-cooking darkening; not suited for deep frying.
Red Beauty ..	17·5–23·5	20·5–21·0	B–C	17	White	Good cooking quality but unacceptable due to pronounced after-cooking darkening; not suited to frying.
Redskin ..	16·5–22·5	18·5–20·0	B–C	16	Creamy white ..	Coarse structure; disintegration marked; suited as new potato for boiling and mashing; after-cooking darkening.
Kurrel ..	14·5–21·5	18·5–20·5	A–B	16–17	Creamy white ..	Quality and flavour inconsistent; not suited for chipping.

A Firm salad type. Utilization: boiling.
B Multi-purpose type. Utilization: salads, mashing, baking, roasting, deep frying.
C Mealy type. Utilization: mashing, baking, roasting.

Specific gravity with its close correlation with starch content is universally recognized as a useful indicator of potato quality. Quality differences exist between tuber lots of the same varieties grown at different localities or at different times. Averaging out the pronounced seasonal fluctuations by comparing boiled tubers with a specific gravity equal to the mean average specific gravity given in Table 6, Sequoia, Bungama and Kurrel were ranked as A to A-B types, and Sebago, Kennebec and Pontiac as A-B to B types (Table 7).

Lujan and Smith (1964) showed that different varieties with identical specific gravity can differ in mealiness. The variety Pontiac, with its low specific gravity but granular structure, illustrates this well when compared with Sebago and Bungama, which are generally higher in specific gravity but finer in structure and different in dryness. Varieties cannot therefore be readily compared on specific gravity levels alone but only in conjunction with other characteristics. Minimum levels of specific gravity can accordingly vary with each variety. Table 7 shows the approximate levels for each variety below which tubers would become too "waxy" or "soapy" to be regarded as acceptable for human consumption.

In Figure I the specific gravity characteristic of Sebago, Kennebec and Pontiac are graphed against Sequoia, Bungama and Kurrel for the season 1964. While the percentage tubers below the acceptable minimum level is already far from satisfactory, even for Sebago, Kennebec and Pontiac, this percentage becomes more unfavourable and inconsistent for the late-maturing, early-bulking Sequoia, Bungama and Kurrel, especially during the years in which they had a low average specific gravity.

Scab detracted much from the value of Pontiac. The type of *Streptomyces* involved is still under investigation, but the disease is assumed to be russet scab caused by a species of *Streptomyces* similar to *S. scabies,* and which develops best in soils which are warmer and more moist (Harrison 1962). Bungama, Sebago and Kennebec showed good resistance to this type of scab. Because of this disease, the use of Pontiac, which otherwise is quite an attractive variety, would be restricted to soils with satisfactory internal drainage or cooler growing conditions.

The short dormancy of Redskin, Bungama and Sebago illustrated their limited capacity for storage. Seed storage has been found to be a particular weakness of Redskin, for which only physiologically young seed appears to be capable of high yields. The deep eye setting, more pronounced under warm growing conditions, also detracts from consumer regard for this variety.

The generally higher percentages and average tuber weights of tubers over 3 oz weight during autumn reflect the reduced tuber set under higher growth temperatures, and indicate the desirability for higher plant densities during autumn. Kennebec, Sequoia, Kurrel and Redskin reflect in their larger tuber size during spring certain advantages for early potato production; during autumn, however, Kennebec, Sequoia, Kurrel, Bungama and Pontiac may produce over-sized tubers.

Target spot was a limiting factor in duration of growth, especially in autumn. Early-maturing varieties such as Royal Red Craig, Pontiac, Sebago and Kennebec were extremely susceptible in contrast with the late-maturing, early-bulking types. General observation indicates that susceptibility to this disease is not a varietal characteristic alone but that resistance is decreased as the physiological age of the seed tuber advances.

New varieties under test did not perform as well as standard varieties in the following respects:

Redskin: Pronounced after-cooking darkening; deep eyes; rapid physiological aging; susceptibility to Irish blight.

Jala: Late maturity with below-average yield; susceptibility to russet scab.

Royal Red Craig: Medium yields; germination problems after cutting; very susceptible to target spot during autumn.

Red Beauty: Pronounced after-cooking darkening; susceptibility to target spot.

Exton: Susceptible to russet scab, Irish blight.

Brownell: Not suited to early harvesting.

Taking into consideration the requirements of both producers and consumers, present recommendations for plantings on heavy alluvial soils in south-eastern Queensland are:

July plantings—Sebago, Kennebec and Pontiac;

February plantings—Sebago and Pontiac, with the proviso that Pontiac be used only where russet scab is not a limiting factor.

V. ACKNOWLEDGEMENTS

Acknowledgement is made of assistance given by the staff of the Queensland Agricultural College, local potato farmers, Mr. I. K. Hughes (Research Pathologist), Mr. D. Winterton (Food Technologist) and the Biometry Branch of the Department of Primary Industries.

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(Received for publication May 22, 1968)

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