INTERCEPTION OF FRUIT FLY HOST MATERIAL FROM VEHICLES TRAVELLING BETWEEN NEW SOUTH WALES AND SOUTH AUSTRALIA IN 1999/2000

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Summary

Data on fruit carriage into the South Australian fruit fly roadblock at Oodla Wirra between September 1999 and May 2000 were analysed to identify peak periods for entry of host material of Queensland Fruit Fly. A significantly higher proportion of vehicles carried fruit during September and May. Vehicles carried significantly greater weight of fruit in September, April and May. Based on vehicle registration number plates, travellers from South Australia and New South Wales made up 74% of the traffic flow, although South Australians were significantly less likely to carry fruit and carried significantly smaller weights of fruit. Significantly more vehicles carried fruit into Oodla Wirra on Monday, Tuesday and Wednesday and the average weight of fruit carried per vehicle was significantly higher on Tuesday and Friday. Periodic operation of the Broken Hill (New South Wales) fruit fly roadblock had no significant impact on fruit interception at the Oodla Wirra site, even though they are only three hours travel time apart and on the same road. The implications of the findings on the regulation of fruit movement between New South Wales and South Australia are discussed.

Keywords: Queensland Fruit Fly, roadside interception, infested fruit

INTRODUCTION

Since the 1890s, South Australian fruit growers have been concerned about the possibility of introduction of Queensland Fruit Fly (Qfly) from the coastal regions of eastern Australia. The first recorded fruit fly outbreak in South Australia (SA) occurred in 1947 (Madge *et al*. 1997). As part of a pest exclusion strategy, the first permanent roadside vehicle inspection stations (called fruit fly roadblocks) in eastern Australia began in 1957 to prevent the entry of potentially infested host fruit. Many subsequent programs were conducted in co-operation between Victoria and New South Wales (NSW) until 1983. Since then, the Oodla Wirra roadblock in SA has operated daily during summer months. A smaller roadblock program has operated intermittently at Broken Hill 250 km away on the Barrier Highway in NSW (Figure 1) since 1997. Both sites only intercept vehicles travelling west. Travellers entering Broken Hill may continue west into SA via Oodla Wirra and continue on to Western Australia or the Northern Territory. Alternatively, they may turn south at Broken Hill and travel into the fruit fly-free horticultural production areas in Menindee (NSW) or the Sunraysia district near Mildura.

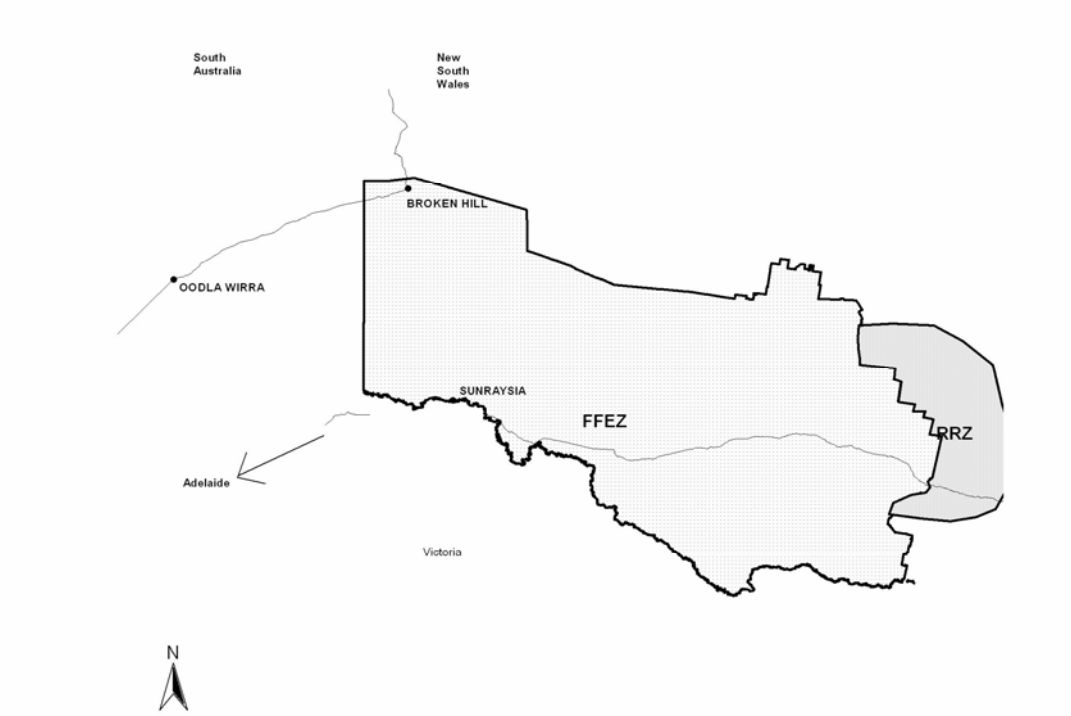
Oodla Wirra inspectors reported that smaller quantities of fruit were intercepted at Oodla Wirra when the Broken Hill roadblock was operational. This paper examines the frequency of fruit interception at Oodla Wirra and factors influencing host fruit importation. It also compares the frequency of fruit interception at Oodla Wirra when the Broken Hill roadblock was operational.

METHODS

The method of operating roadside vehicle inspections in NSW has been previously described by Dominiak *et al.* (2001) and was used at Broken Hill. There were two main differences between operations at Broken Hill and Oodla Wirra. All vehicles were stopped at Oodla Wirra whereas only 85% were intercepted at Broken Hill. The Oodla Wirra site was operational on each day during the evaluation period (September 1999 – May 2000), whereas the Broken Hill site was operational for only 45 days.

South Australian operators recorded daily information on the total number of vehicles passing through the site, the number of vehicles with host fruit, the weight of fruit confiscated, and the State of origin of vehicles based on the vehicle number plate. Travellers from Tasmania, Western Australia and Northern Territory were combined as “others”. NSW Agriculture supplied records of the days of operation at Broken Hill including the number of vehicles with and without fruit. Daily Oodla Wirra roadblock data were compared with those for the dates when the Broken Hill roadblock was or was not operational. A similar analysis was conducted allowing for a one day delay in the travel between the two sites, in case travellers stopped in Broken Hill overnight before travelling onto Oodla Wirra.

Figure 1. Map of the Fruit Fly Exclusion Zone showing the positions of Oodla Wirra and Broken Hill, and other major features.



FFEZ fruit fly exclusion zone; RRZ risk reduction zone

The binary data of presence and absence of fruit from each vehicle inspected were analysed using a generalized linear model with an assumption of Bernoulli distribution underlying the data and with a logit function as the link function between observed values and the parameters to be estimated (Cox 1970). The comparisons between months, traveller origins or days of the week were tested using a least significant difference (LSD) test on the logit scale. Fruit weights confiscated were analysed using the conventional analysis of variance. LSD test was used to separate the effects of the above factors.

RESULTS

A significantly ($P<0.01$) higher proportion of vehicles carried fruit into the Oodla Wirra roadblock in September and May than in other months (Table 1). The lowest proportion of vehicles carrying fruit was recorded in November and December however, there were generally more vehicles passing through the roadblock during these months. Mean weight of fruit carried per vehicle found with fruit ranged from 279-484g with significantly larger amounts carried in September, April and May (Table 1).

A significantly ($P<0.01$) greater proportion of vehicles passing through the roadblock on Monday, Tuesday or Wednesday were likely to be carrying fruit (Table 2). Significantly larger weights of host fruit were carried per vehicle on Friday and Tuesday with a range of 432g (Friday) to 301g (Sunday). Although traffic flow was greatest on Sunday it was the day when fruit introduction was least likely. This was because relatively fewer travellers carried fruit and also carried less weight of fruit. Friday also had a high traffic flow although with significantly lower proportions of fruit per vehicle, however the weight of fruit carried by travellers was significantly higher.

A significantly ($P<0.01$) higher proportion of vehicles carried fruit into the Oodla Wirra roadblock from Victoria, with significantly fewer travellers from SA carrying fruit (Table 3). However there were about ten times as many travellers from SA than from Victoria. There were significant differences in the weight of fruit carried by South Australians (174g) and by Victorians (591g).

There was no significant difference in either the proportion of vehicles carrying fruit into the Oodla Wirra roadblock nor in the average amount of fruit carried per vehicle irrespective of whether the Broken Hill roadblock was or was not operating (Table 4). There were also no significant differences allowing for a one day delay. When the proportions of vehicles with fruit for each date at Oodla Wirra

Table 1. Proportion of vehicles carrying fruit and amount of fruit seized at the Oodla Wirra roadblock.

Month	Total no. vehicles inspected	% vehicles with fruit	Mean weight of fruit seized (g)
September	8232	20.07d	484d
October	9536	17.14c	375c
November	8188	14.02a	278a
December	9795	14.35a	297ab
January	9489	16.01b	328bc
February	7605	15.50b	318ab
March	7633	15.63b	341bc
April	8435	17.43c	439d
May	7195	19.15d	468d

[1]Data in individual columns followed by the same letter were not significantly different

Table 2. Proportion of vehicles carrying fruit and amount of fruit seized on each day of the week at the Oodla Wirra roadblock.

Day	Total no. vehicles inspected	% vehicles with fruit	Mean weight of fruit seized (g)
Monday	10535	17.79cd	371b
Tuesday	9739	17.83d	396bc
Wednesday	10441	17.18bcd	366b
Thursday	10744	16.72bc	353b
Friday	12256	14.98a	432c
Saturday	9957	16.23ab	371b
Sunday	12436	15.50a	301a

[1]Data in individual columns followed by the same letter were not significantly different

Table 3. Proportion of vehicles from different States carrying fruit and amount of fruit seized at the Oodla Wirra roadblock.

State of origin	Total no. vehicles	% vehicles with fruit	Mean weight of fruit seized (g)
South Australia	34020	11.93a	174a
New South Wales	22292	18.01b	305b
Queensland	10360	21.66c	403c
Victoria	3909	28.09d	591d
Other	5527	21.66c	377c
TOTAL	76108		

[1]Data in individual columns followed by the same letter were not significantly different

Table 4. Proportion of vehicles carrying fruit and amount of fruit seized at the Oodla Wirra roadblock when the Broken Hill roadblock was or was not operating.

Operation of Broken Hill roadblock	% vehicles with fruit (mean weight of fruit seized (g))		
	October	November	December
Operating	17.0 (361)	14.0 (279)	14.0 (273)
Not operating	18.0 (375)	16.0 (262)	14.0 (243)

and Broken Hill were compared, there was a higher proportion of traffic carrying fruit into Oodla Wirra on 42 of 45 comparisons. The average carriage rate at Broken Hill was 9% compared with 14-17% at Oodla Wirra.

DISCUSSION

September and May were the months with the highest proportion of traffic carrying host fruit, and with the higher weights of fruit carried. These represent the months when it was most likely that host fruit will be introduced into SA. Perhaps travellers recognised that the roadblocks were not operational in winter, and that the opening operations in September caught travellers unaware. Similarly travellers carried fruit and were caught just before the winter shutdown of operations.

The peak holiday season months of December and January recorded low proportions of traffic with fruit and low weights of fruit (Table 1). The SA, NSW and Victorian school holiday month of April had higher traffic flows than adjacent months but there was a higher proportion of traffic with fruit and a higher average weight of fruit carried in May. These observations seem to contradict the perceptions that carriage of host fruit is more likely during holiday times. Analysis of the 1968 - 1977 records showed that Qfly was most frequently found in fruit carried by travellers during the period December to April (Madge *et al.* 1997).

Travellers from SA made up 45% of the traffic flow and were least likely (12%) to carry fruit and carried significantly less fruit (Table 3). Given the high proportion of traffic flow, it seems that "local" SA travellers returning to a fruit fly free State (Madge *et al.* 1997) do not cease to carry fruit at all. Perhaps this is because they know that fruit would be confiscated at no cost to the traveller at Oodla Wirra. NSW travellers made up 29% of the traffic flow and a significantly higher proportion (21%) and weight of fruit. Travellers from NSW and SA made up 74% of the traffic flow so any decrease in the amount of fruit carried, or proportion of this traffic carrying fruit is likely to minimise host fruit introductions into SA.

The anecdotal suggestion that fruit interception at the Broken Hill roadblock influenced the frequency and weight of fruit interception at Oodla Wirra is disproved. Our results indicate that there was no significant difference in the proportion of vehicles with fruit, or in weight of fruit carried into Oodla Wirra on the days when the Broken Hill roadblock was operational (Table 4). The result was no different if the data for Oodla Wirra was lagged for one day to take account of travellers staying overnight in Broken Hill. This is disturbing and difficult to comprehend. There were spot fines clearly advertised on road side signs on the way into Broken Hill but fines were rarely imposed at Oodla Wirra. Some travellers may forfeit fruit at the Broken Hill disposal site but buy more fruit at Broken Hill knowing there was no penalty for fruit introduction at Oodla Wirra. Alternatively, it is possible that vehicles have travelled for at least four hours through desert type conditions before reaching the Broken Hill site. Travellers may have eaten much of their fruit by the time they reached Broken Hill and so may restock in Broken Hill before continuing onto Oodla Wirra. We suspect that the lack of interaction between Oodla Wirra and Broken Hill roadblocks may be a consequence of fruit purchases and the absence of financial penalties for carrying fruit into Oodla Wirra.

In NSW, the use of fines alone had little effect on the proportion of fruit carried into Riverina roadblocks (Dominiak *et al.* 2001). However, there was a 50% decline in fruit carried after the fines were advised on roadside signs (Dominiak unpubl.). We recommend a similar program of fines and advertising be instigated in SA to decrease the amount of fruit being carried into the Oodla Wirra site.

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