

**Myxomatosis: the virulence of  
field strains of myxoma virus in a population of wild rabbits  
(*Oryctolagus cuniculus* L.) with high resistance  
to myxomatosis**

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SUMMARY

The virulence of field strains of myxoma virus is increasing in the Mallee region of Victoria where the resistance of the rabbit to myxomatosis is high. This suggests that the climax association will be a moderately severe disease.

INTRODUCTION

Myxoma virus was released in south-eastern Australia in 1950. The initial mortality rate was about 99·5%. The appearance of attenuated strains of virus and the rapid selection for resistance in the rabbit which followed reduced the mortality rate sharply (Fenner & Ratcliffe, 1965).

Initially the field strains of myxoma virus covered a wide range of virulence from very highly virulent to severely attenuated strains with 100% recovery rates in unselected rabbits. The range then narrowed with the most and least virulent strains disappearing from the field.

It was suggested by Fenner & Ratcliffe (1965) that increasing resistance of the rabbit might result in a trend to increased virulence of field strains. In Victoria resistance is highest in the Mallee region in the north-west of the state (Douglas, 1968; Edmonds, Nolan & Shepherd, unpublished data). This paper reports on the changes of virulence of field strains in the Mallee region from 1959 to 1974 and compares their virulence with that of strains collected elsewhere in Victoria.

MATERIALS AND METHODS

Field strains were collected as eyelids from rabbits showing symptoms of myxomatosis and preserved for transport in 50% glycerol-saline. They were stored at the Keith Turnbull Research Station at -12° C. until tested.

Testing for virulence was by passage through one laboratory rabbit and intradermal inoculation of about 10 ID<sub>50</sub> of the passaged strain into five laboratory rabbits. Each strain was graded on the basis of the response of the challenged rabbits (Fenner & Ratcliffe, 1965, pp. 216-21).

Table 1. *The virulence of strains of myxoma virus recovered from the field in the Mallee region and elsewhere in Victoria\**

Collection period	No. tested	Virulence grade (as percentage)				
		I	II	III	IV	V
Collection area: Mallee						
1959-63	70	—	4.3	57.1	34.3	4.3
1964-66	51	2.0	—	64.7	31.3	2.0
1967-69	31	—	—	68.1	31.9	—
1970-74	102	1.0	6.9	77.5	14.7	—
Collection area: Victoria less Mallee						
1959-63	379	2.1	12.4	61.2	19.5	4.7
1964-66	255	0.4	0.4	63.5	34.5	1.2
1967-69	198	—	—	61.6	36.4	2.0
1970-74	72	—	1.4	69.4	29.2	—

\* Data for the period 1959-66 from Douglas (1968) and Nolan (personal communication).

#### RESULTS

The data are presented in Table 1 using the simplified grading system of five grades ranging from Grade I (most highly virulent) to Grade V (severely attenuated).

#### DISCUSSION

The first widespread collection and sampling undertaken, from 1959 to 1963, suggests that the tendency for strains to be grouped in the mid-range of virulence occurred earlier in the Mallee than elsewhere in Victoria, i.e. that the disappearance of the most virulent and most attenuated strains was dependent to some extent on the rate of increase in resistance in the rabbit population.

Since about 1964 there has been a slow but apparently consistent increase in the virulence of field strains collected from the Mallee, with a reduction in the occurrence of Grade IV strains and the reappearance of Grade II strains (7% during 1970-4).

Selection for more virulent strains is occurring in a population of wild rabbits of high resistance and this selection has not happened to the same extent in Victoria generally. However, the 1970-4 data suggest that it may now be occurring in other regions.

The data support the suggestion of Fenner & Ratcliffe (1965) that the interaction of virulence and resistance would maintain a moderately severe disease for a long time. The continuing evolution of virus and rabbit indicates that a climax association is at least some years away but it now seems likely that the climax association will be of a moderately severe disease with field strains of high virulence in a resistant population.

#### REFERENCES

- DOUGLAS, G. W. (1968). Observations on the virulence of field strains of myxoma virus and on genetic resistance in wild rabbits in Victoria. *Australian Vermin Control Conference Papers*, 1968, p. 86.
- FENNER, F. & RATCLIFFE, F. N. (1965). *Myxomatosis*. Cambridge University Press.