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Reconstructing the great escape

Flies, worms, and flowers exceed me still.

Isaac Watts, 'Against Pride in Clothes', 1715

The escape of RHDV from the quarantine compound on Wardang Island was associated with the first few warm days of spring. This is the time of year when flies and other insects overwintering in warmer parts of inland Australia disperse southward. Fly-trapping on Wardang Island between mid-August and late September had shown a thousand-fold increase in bush flies on the island and smaller though substantial increases in blowflies (McColl, Merchant *et al*. 2002). Importantly, routine checks using polymerase chain reaction (PCR) to detect virus revealed RHDV on some flies taken from traps on 24 September 1995. This corresponded with the virus crossing, a few days earlier, from the pen containing RHDV-infected rabbits into the pens of susceptible rabbits being readied for later experiments.

The next step in which the virus spread from the island to the mainland was less clear. I suspected that weather played an important role, and so I arranged to talk to Clem Davis, a senior weather forecaster at the Bureau of Meteorology in Canberra. I hadn't explained in advance exactly why I wanted to see him, but when I walked into the office I was greeted with 'You're here to ask how the calicivirus got off Wardang Island aren't you?' Clem had obviously been doing some homework.

A series of daily weather maps already unrolled on the table showed clearly when sharp cold fronts moved across southern Australia, while Clem explained how sudden changes in wind direction from northerlies to south-westerlies might have first carried flies onto Wardang Island then potentially dispersed virus-contaminated flies from the island across mainland South Australia.

Later, this hunch was to be backed up by CSIRO entomologists Drs Keith Wardhaugh and Wayne Rochester, who calculated likely fly movements from Wardang Island by taking into account wind speed and direction during periods when it was warm enough for flies to be airborne. These simulations were prepared for each day over several weeks when RHD might have spread, but it was simulations for the days 12–14 October that best predicted the distribution of subsequent cases of RHD found around Yunta and elsewhere (Newsome and Mutze 1995; Wardhaugh and Rochester, 1996; Figure 11.8 in Fenner and Fantini 1999). Winds would have spread contaminated flies in plumes like spokes in a wheel as a slowly spiralling weather system – warm by day and cool by night – crossed the virus-infected area. Nonetheless, it was in the north-east of South Australia where rabbits were unusually abundant that RHD first became apparent.

There are other reasons for believing that insects must have spread RHD at that time. Rabbits in the north-east of South Australia largely confine themselves to a home range about 600 m in diameter and, because virus only begins to be shed approximately 36 h after rabbits