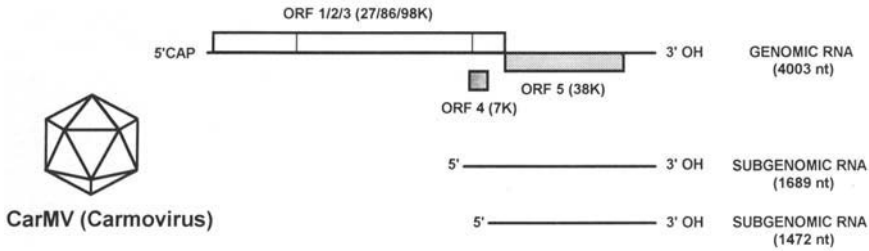

Fig. 1. Virus structure and genomic organization of carnation mottle virus (CarMV). Location of the five open reading frames is indicated, together with the sizes of the proteins they code for. Location and length of the two 3' coterminal subgenomic RNAs is also indicated.

coat protein (CP) is the 3'-terminal p38 reading frame. Two subgenomic RNAs (sgRNA) of 1.5 and 1.7 kb, coterminal with the 3' genomic end, are synthesized and encapsidated in vivo. In vitro translation assays have identified all the proteins that CarMV codes for ***(3–5)***. The most abundant translation products from the genomic RNA are p27 and p86, CP and p7 being almost silent ***(3)***. p98 was identified as an in vitro translation product of CarMV RNA only after using a lysate optimized for double readthrough ***(4)***, although comparison with other carmoviruses (*see next paragraph*) has questioned its in vivo existence. The smaller of the sgRNAs directs the translation of the CP p38; translation of the 1.7-kb sgRNA renders p7 ***(5)***.

TCV genome organization is closely related to that of CarMV ***(6)***. Remarkable differences are, however, that TCV lacks the second readthrough protein that would correspond to CarMV p98 and codes for a set of two, instead of one, small proteins (p8 and p9) in the central region of the genome. The use of infectious in vitro transcripts has allowed the identification of some of the functions of the TCV proteins ***(7)***. Thus, p8, p9, and the CP were shown to be required for systemic invasion; p28 and p88, which correspond to CarMV p27 and p86, were required for viral RNA replication.

In general, carmoviruses reach high levels of accumulation in their corresponding hosts. The virions are highly stable in plant sap, where they may remain infectious for long periods (2–6 wk) at room temperature. Ultrastructural studies have shown that the virus particles are easily recognized in the cytoplasm of infected cells. Carmoviruses are also good immunogens and generally there is not crossreactivity among them.

Initially, carmovirus purification methods consisted of the extraction of the tissue in neutral phosphate buffers and subsequent clarification with organic solvents, followed by differential and density gradient centrifugations ***(1)***.