

C H A P T E R 15



wide conservation of all *D. melanogaster* populations to the P+ condition within the last century.

The purpose of this chapter is to review the evidence for *P* element horizontal transfer that has accumulated during the last two decades. There are two main advantages to using *P* elements to study horizontal transfer. First, the *P* element is one of the best described eukaryotic transposable elements (Engels, 1989), and provided one of the earliest reports of transposable element horizontal transfer (Daniels et al., 1990)

other mutations, that disrupt coding sequences.
These non-autonomous elements are unable to

1980s invariably carried *P* elements. In contrast, *P* elements were absent from strains collected more than 20 years earlier from around the world (Kidwell, 1979, 1983; Anxolabéhère et al., 1988). This was consistent with a recent *P* element invasion of the cosmopolitan species, *D. melanogaster* (Kidwell, 1979, 1983). Recent invasion was supported by a number of observa-



FIGURE 15.2 Phylogenetic analysis of *P*

recent invasion by canonical *P* elements, each of the distinct subfamilies of *P* elements in the *saltans* and *willistoni* species groups may have a distinct evolutionary origin. Thus *P* element evolution in these two groups may be characterized by successive waves of horizontal transfer that have occurred at various times in the past. The relatively recent invasion of the *Drosophila* species groups by *P* elements is supported by the fact that the *P* elements in these groups are highly similar to those found in other species groups. The relatively recent invasion of the *Drosophila* species groups by *P* elements is supported by the fact that the *P* elements in these groups are highly similar to those found in other species groups.

reasons stated above this is very likely to be an underestimate. It can be concluded that canonical *P* elements have transferred horizontally be-

from *Drosophila sucinea* of the *willistoni* group showed no affinity to any of the other 91 sequences (Clark et al., 1995). Whereas nucleotide sequence divergence between this element and other sequences from the *saltans* and *willistoni* groups is about 35%, this sequence differs by

