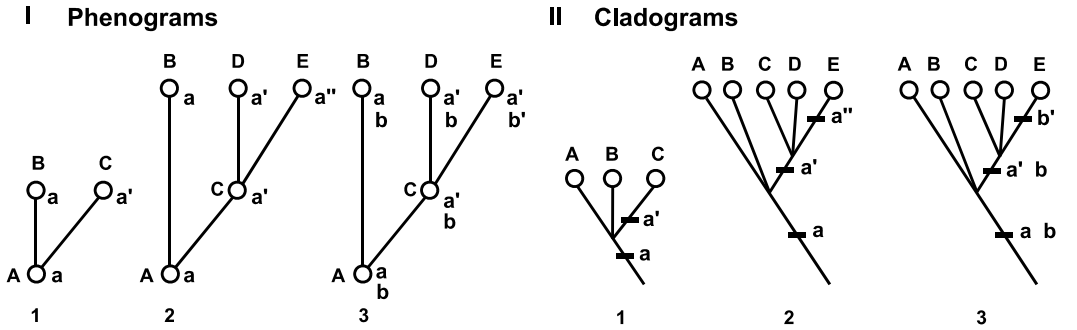
f37 Hennig terminology < in use >



Evolution is connected with speciation. Hennigian reasoning is that when a species (reproductive community) is split into two mutually isolated communities of reproduction, there is always a change (transformation) of at least one character *a* of the ancestral species A. All the descendants of A will be a *monophyletic* group, by definition. One of two daughter species B and C will retain a character *a* in the condition that their common ancestor possessed and the other will have *a* in a transformed ("derived") condition *a'*. This character *a'* will have significance for phylogenetic systematics if the bearer, let this be C, of the derived character *a'* is split again into two successor species, D and E. Then there are two possibilities: *a'* may be further transformed into *a''* in one of the two new successor species or *a'* may remain unaltered in both successor species D and C, while in one of them a different character *b* is transformed into condition *b'*.

In a monophyletic group, characters or character conditions from which transformation started (*a, b*) are *plesiomorphic*, and the derived conditions are *apomorphic*. Thus (*a'', b''*) are apomorphic (derived) relative to (*a', b'*) which, though plesiomorphic (ancestral) to them, are themselves apomorphic (derived) relative to (*a, b*).

In the real process of evolution, character conditions *a', a''*, etc. produced by transformation of an original condition a will sometimes denote different characters, and sometimes different conditions of one and the same character.

Apomorphic characters used to show that a group which posses them is monophyletic are called *synapomorphic* characters. Apomorphic features that can be ignored when discussing the relations of a particular monophyletic group to other groups are called *autapomorphic* characters.

Symplesiomorphy is the presence of plesiamorphic characters in different species. For example, the species B and D are symplesiomorphic with respect to character *b*. The possession of plesiomorphic characters (symplesiomorphy) does not justify the conclusion that the bearers of these characters form a monophyletic group as these characters in the stem species need not have been common only to them as other species may have descended from the same.

Synapomorphy is the presence of apomorphic characters in different species. For example, the species D and E are synapomorphic with respect to character *a* or to the group of characters *a'* and *a*''. Synapomorphy must be shown for the two or more species if the assumption that they form a monophyletic group is to be sustained. Synapomorphies are converted into a genealogy by identifying the tree(s) that allows a unique origin for each derived condition.

These terms, defined by Hennig in *Phylogenetic Systematics,*[1] relate to phenograms, which include evolutionary concepts such as specific ancestors, and to cladograms in which no ancestors can be sensibly recognized. In a cladogram, no distinction need be made between A and B as either with the other could have been used to determine the derived condition of the considered character a' possessed by C and D. The same holds for C and D. ❑