The evolution of Vertebrates

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BIO1130 Section A6

Demonstrators:

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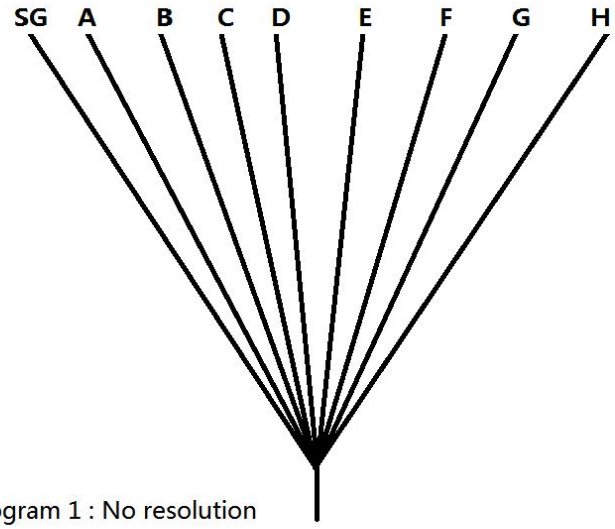
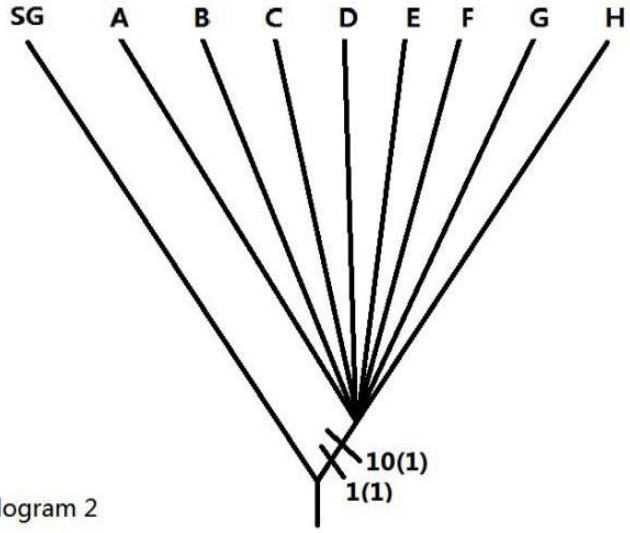
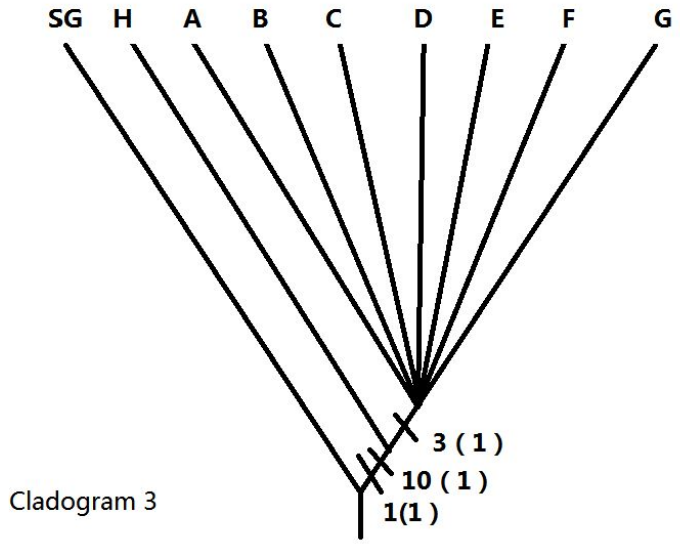


Cladogram 1 : No resolution



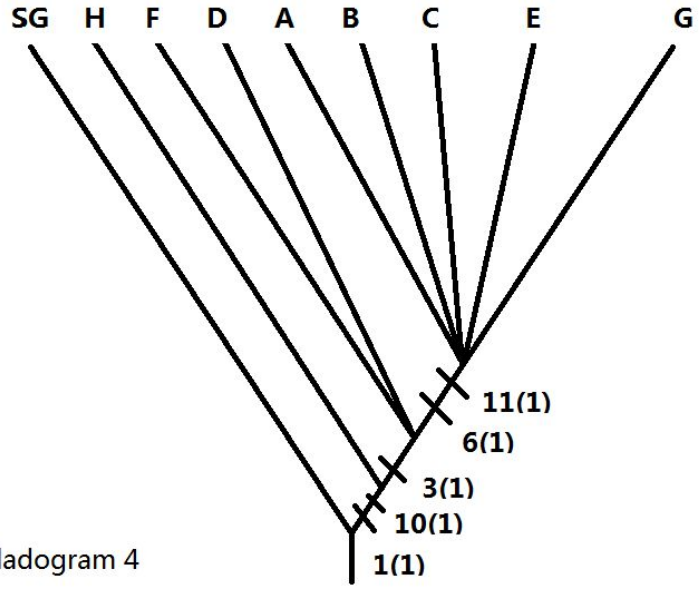
Cladogram 2

Step 1: Character #1 and #10 indicate that all the species of the ingroup have stomach [1(1)] and jaws [10(1)], while the outgroup do not have both of them. Therefore, this creates a new monophyletic group: [A - H].



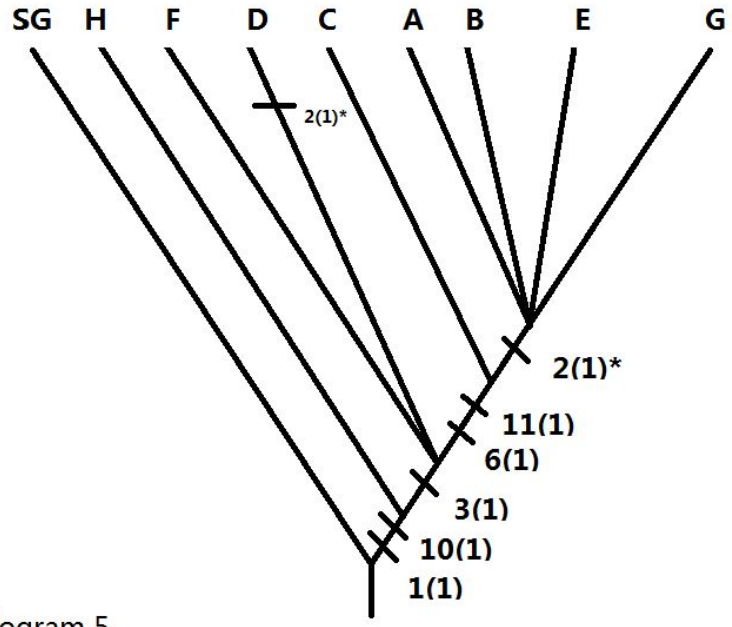
Cladogram 3

Step 2: Character #3 indicates that the present of lung and derivatives [3(1)] is not found in species SG and H, but is derived in the other taxa. Therefore, this creates a new monophyletic group: [A - G].



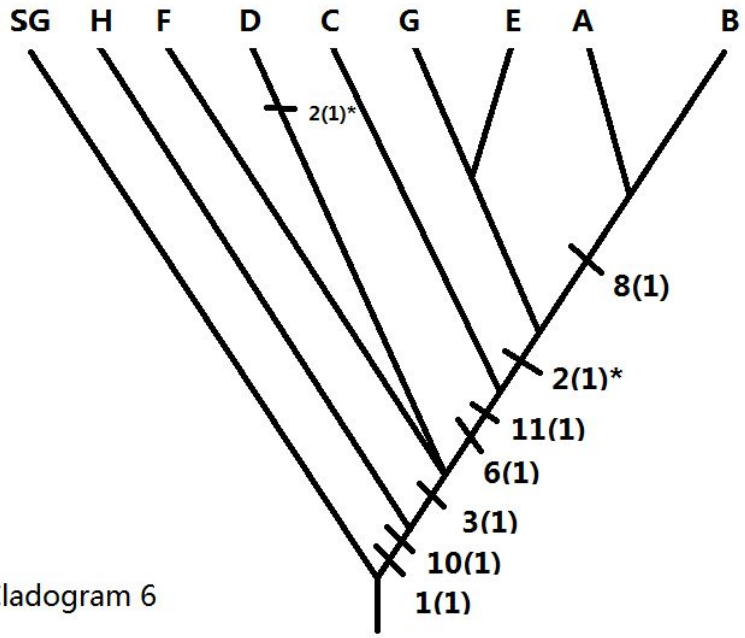
Cladogram 4

Step 3: Character #6 and #11 indicate that the transformation from mesonephric to metanephros [6(1)] and the present of amnion [11(1)] is founded and derived in the group [ABCEG]. Therefore, this creates two new monophyletic group: [FD] and [ABCEG].



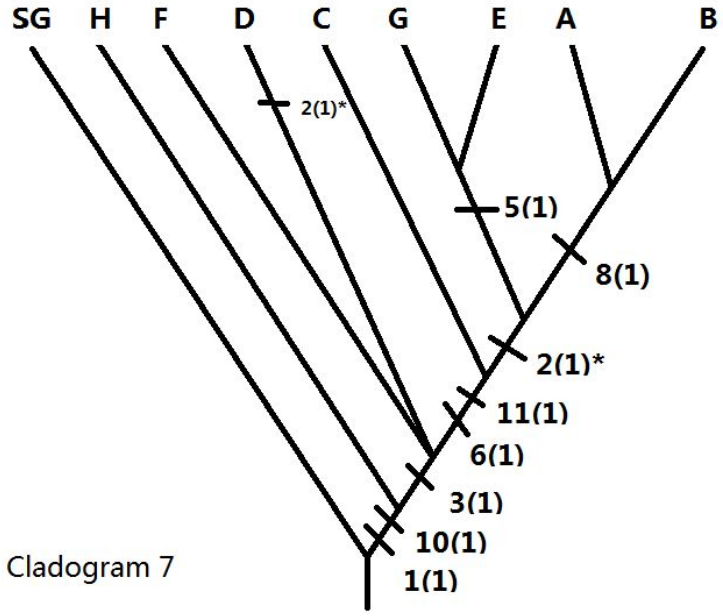
Cladogram 5

Step 4: Character #2 indicates that the present of paired limbs [2(1)] is founded and derived in the group [ABEG], but is also founded in species D. Therefore, this character that appear on species D is convergence homoplasy.



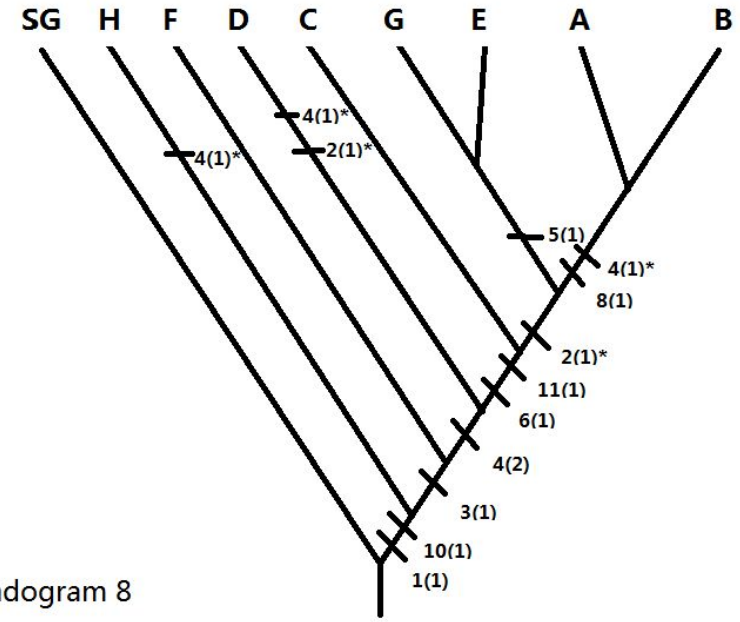
Cladogram 6

Step 5: Character #8 indicates that the present of hear or fur [8(1)] is founded only in species A and B. Therefore, this creates two monophyletic group: [GE] and [AB].



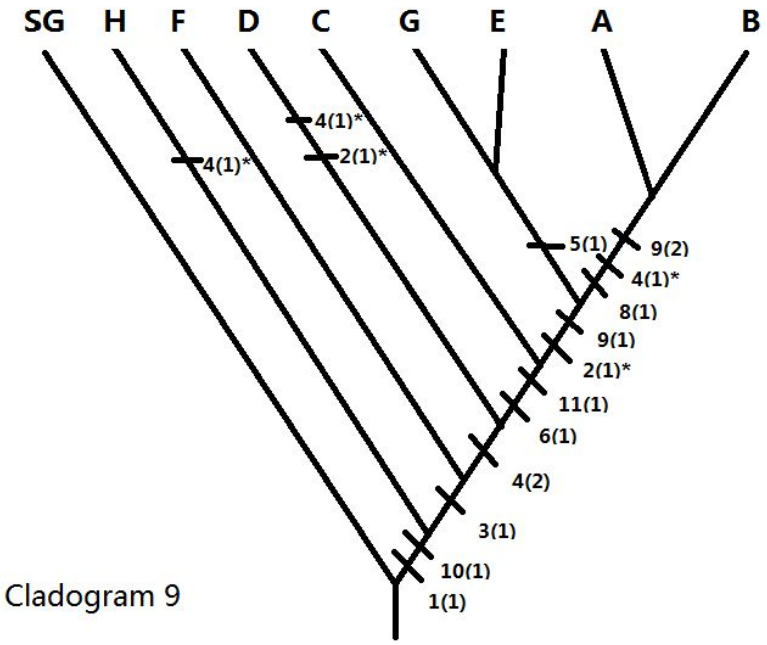
Cladogram 7

Step 6: Character #5 indicates that the present of gizzard [5(1)] only founded in species G and E.



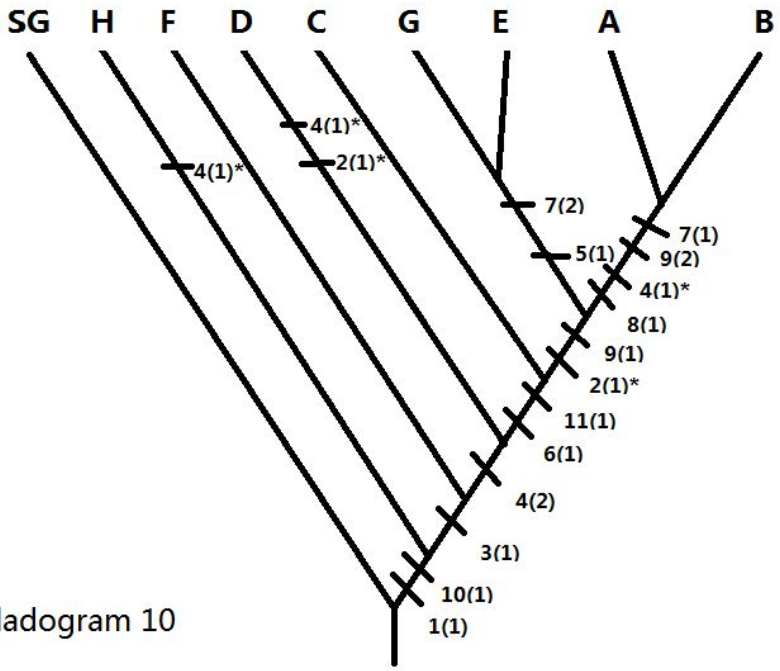
Cladogram 8

Step 7: Character #4 indicates the variations of the type of nitrogenous wastes. Species C, G, E possess 4(2), whose nitrogenous wastes are uric acid. And species H, D, A and B possess 4(1), whose nitrogenous wastes are urea. Therefore, character 4(1) can be a reversal homoplasy. Since these species are live in totally different environment.



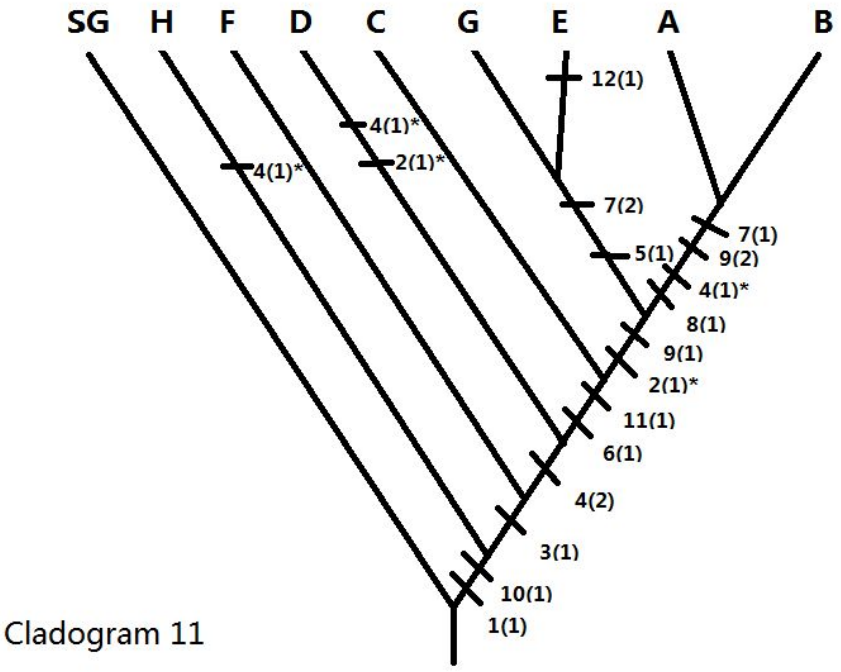
Cladogram 9

Step 8: Character #9 indicates the variations of the number of digits on hind limb. Species G and E possess 4 digits on hind limb [9(1)], and species A and B possess 5 digits on hind limb [9(2)].



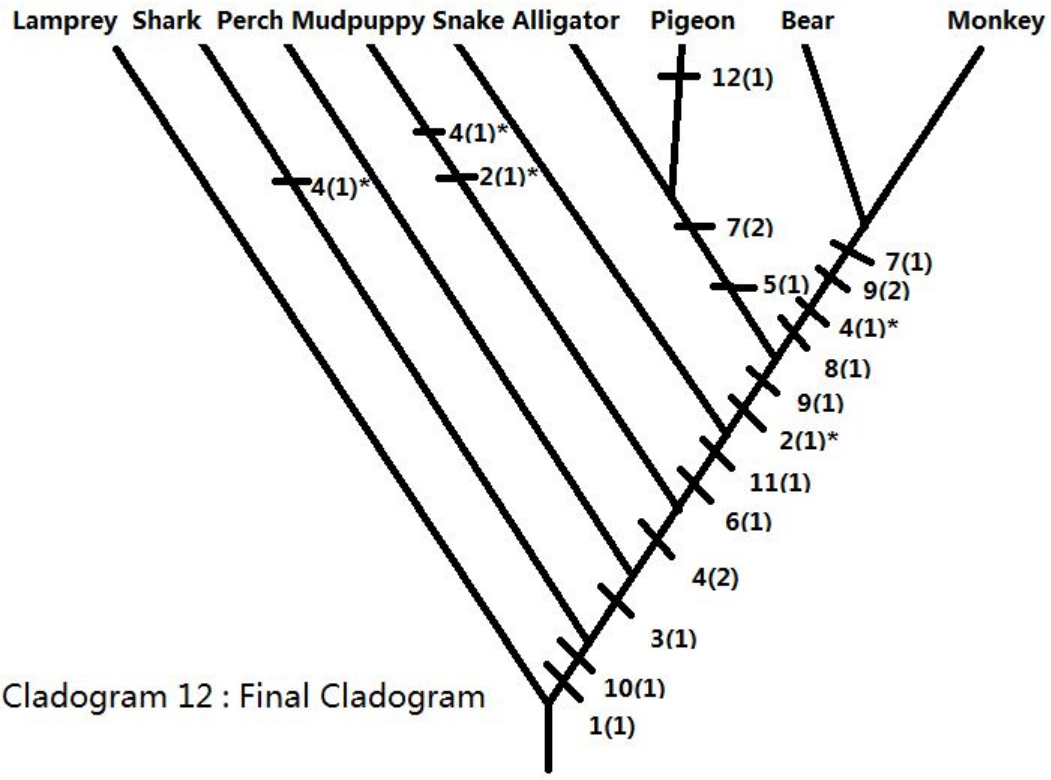
Cladogram 10

Step 9: Character #7 indicates the variations of the variations of the number of temporal fenestrae. Species G and E possess two temporal fenestrae [7(2)], and species A and B possess one temporal fenestrae [7(1)].



Cladogram 11

Step 10: Character #12 indicates that species E is the only species whose forelimbs are modified for flight [12(1)].



Cladogram 12 : Final Cladogram

Conclusion:

a). In this cladogram, species Pigeon, Bear and Monkey are endothermic.

b). The character of endothermic will present between the branch of two monophyletic of [GE](Alligator and Pigeon) and [AB](Bear and Monkey), and will also present at the branch of species E(Pigeon). Besides, the character of endothermic is convergence homoplasy, because it derived in species who do not share the same ancestor and there is not such kind of character before these species.