SEX CHANGING FISH

large males in the area or sped up by their absence.

(8) Size is another factor in sex change. Scientists know that the largest and most dominant great white sharks are the females. There is speculation that great whites exhibit protandrous sex change from male to female and that when a male gets large enough, he will change into a female. This change provides a species survival advantage because it ensures that only the largest and most experienced great whites will have the ability to give birth to live shark pups. It takes 11 months for baby sharks to gestate and the mother's size and ability to catch food and defend her territory will be critical during this time.

(9) Fish born with male XY sex chromosomes will still have these chromosomes when they change into females. Fish born with female XX sex chromosomes will still retain these chromosomes when they change into males. What causes sequential hermaphroditism is most likely a change in the function of an enzyme called aromatase. This enzyme controls the ratio of androgens (male sex hormones) and estrogens (female sex hormones) that are produced in fish.

Article Questions

1) What is the difference between protandry and protogyny?
   In protandry an organism starts off male and changes into a female while in protogyny an organism starts off female and changes into a male.(2)

2) How is sequential hermaphroditism different from simultaneous hermaphroditism?
   In sequential hermaphroditism, an organism replaces one sex with another while in simultaneous hermaphroditism both sexes are present at the same time.(2)

3) In clown fish, what happens when the dominant female dies?
   The most dominant male turns into the dominant female and the most dominant immature male turns into the dominate male and becomes her mate.(3)

4) Why is it an advantage for female clown fish to be larger and more dominant over the male?
   As clown fish get larger, size increase becomes more reproductively beneficial for females while larger sizes have no reproductive advantage for the males.(4)

5) In blue-streaked cleaner wrasse, what happens when the dominant male dies?
   When the dominant male dies, the largest and most dominant female transforms into the dominant male.(5)

6) What type of sex change is exhibited by great white sharks and what species survival advantage is provided by this sex change?
   Great whites transform from male to female when they get to a certain size. It benefits the species to have the largest and most experienced members be the ones to bear the offspring because that's when large size will provide an advantage for getting food and protecting territory.(8)

7) How does aromatase affect the ability of sequential hermaphrodites to change sex?
   Aromatase controls the ratio of androgens and estrogens in the fish. Altering this ratio can change fish from male to female (if estrogen levels are higher) or female to male (if androgen levels are higher). (9)