Heritable, individual (phenotypic) variation is often referred to as the raw material of evolution. Most researchers collect physiological data on individual birds, and the “physiology-performance-fitness paradigm” provides a robust conceptual approach to the question of the evolutionary consequences of physiological variation. This symposium will consider different study systems (breeding, migration, over-wintering), explain what we know about phenotypic variation in underlying physiology associated with these specific functional states, and then address the question of whether individual variation in physiology contributes to, or explains, individual differences in 'performance' (surrogates of fitness) or individual variation in fitness (e.g., survival, fecundity, lifetime reproductive success). Are individuals that express higher (or lower) trait values for specific physiological traits or systems higher quality individuals, and do they have higher (or lower) fitness? Behavioral syndromes and age-dependent carry-over effects that might represent concepts that integrate physiology, individual quality and fitness across life-history stages will be discussed.