Animal behavior is a phenomenon that has been studied by diverse fields of knowledge, though its contributions to evolutionary theory has been explored form the hegemonic Neo-Darwinian theory (adaptive fitness, survival value, phylogenetic relations, gens-behaviors frequencies), so hindering a more general and deep integration with Developmental Systems Theory and the biosemiotics perspective. In this work we show how behavior is an agent of the evolutionary modification of phenotypes, and also the compatibility between Uexküll’s biosemiotic perspective and Oyama’s DST. This integration, considers that the expression of genetic information is regulated and interpreted by set of self-referential hierarchical levels, which are the foundation of phenotypic organization. All along ontogeny these levels mediate the genotype-organism-environment relationships by means of adjusting and coupling between cellular metabolic systems and the environment, that define the eco-physiological context in which the Baldwin’s Organic Selection takes place. Behavioral adjustments register environmental information and couple it with information resident in the physiologic-metabolic level, that once it is interpreted by the organisms, define the action to be implemented upon the environment that will be thus modified, as the functional circle is closed. These processes are indispensable for the maintenance of the organisms that cooperate in the formation of Umwelts’ assimilative-interpretative landscapes that give rise to Genetic Assimilation, so assuring canalized ranges of variations for subsequent generations. Consequently, organisms’ behaviors along evolution change the selective pressure scenarios upon which organisms are submitted, and so becoming the leading force of evolutionary modifications to the extent that it makes possible the establishment of new life strategies that expand the future possibilities of evolution.

**Keywords**

Learning, instinctive behavior, Developmental Systems Theory, Umwelt, Organic selection, Comparative Psychology.