



Simposio Internacional: El legado de Alan Turing
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Mathematics and biology: a difficult relation

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In 1952 Alan Turing authored an article on the chemical basis of morphogenesis (The chemical basis of morphogenesis. Phil. Trans. Roy. Soc. London B 37-72.237), his only published work related with Biology. His opening words tersely describe his approach as follows: It is suggested that a system of chemical substances, called morphogens, reacting together and diffusing through a tissue, is adequate to account for the main phenomena of morphogenesis. Such a system, although it may originally be quite homogeneous, may later develop a pattern or structure due to an instability of the homogeneous equilibrium, which is triggered off by random disturbances. Turing was not the first to use mathematical methods to deal with biological problems. Moreover, his approach remained unnoticed, or was plainly rejected by many biologists at that time, and rapidly fell into oblivion. His proposals were independently rediscovered about twenty years later, only to meet with a hostile reception among leading developmental biologists. An argument often used in the resulting exchanges is that Life is too complex to be reduced to a mathematical formulation. However, such misgivings have not prevented Ecology and Mathematics from mutually benefiting from their respective discoveries during the XX century. In this lecture, I will briefly describe some striking aspects of the exciting, if difficult, relation between Mathematics and Biology throughout history. Particular attention will be paid to developments that have taken place during the last half century, and which can be related, at least in part, to Turing's work.

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