In this work, we develop boundedness and stability results for nonlinear systems with time-delays. Our approach is based on Lyapunov-Razumikhin functions, where the underlying idea involves treating state variables with time-delays as disturbances. The advantage of such an approach is that we can obtain various properties for a system with time-delays by exploring robust stability properties of a system with disturbances instead of invoking Lyapunov-Krasovskii functionals, which can be difficult to construct. We apply our results to a biological model for hematopoiesis (blood cell production process) to improve the previous conclusions drawn when only linear techniques were employed. (Received September 20, 2011)