

Dynamics of One-prey and Two-predator System Incorporated with the Concept of Additional Food for Predators using Beddington-DeAngelis Functional Response

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Abstract—The role of additional food provided to predators has been acknowledged as a significant factor in biological control of many species. Work has been earlier done in this direction which indicates that both the quality and quantity of additional food plays an important role in controlling pest. Various studies have also done on the concept of mutual interference between predators which truly effects the dynamics of the system along with effecting the biological control programs. In this article, prey predator relationship has been studied along with the concept of additional food by means of three nonlinear ordinary differential equations using Beddington-DeAngelis functional response and by incorporating this type of functional response, role of mutual interference between the predators is also highlighted along with the additional food being provided to predators. Stability analysis has been carried out using Lyapunov stability theory and to confirm theoretical results, numerical simulations has been done at the end which reflects that the quantity of additional food also changes the dynamics of the system.