

Matrix Population Models for *Prunus Serotina*

Céline WANG

Université de Lille

`celine.wang@univ-lille.fr`

The American black cherry (*P. serotina* Ehrh.) is a tree species native to North America that was introduced into European forests in the 17th century. Over the last three decades or so, it has spread to the forests of Western and Central Europe, competing with local species. In order to model its dynamic, we constructed and studied (simplified) demographic matrix models to explore the local population dynamics of this species. The species population on a plot of land in year n is described by a state vector $s_n = M_n \cdots M_1 s_0$, where M_i is a Leslie (or Lefkovich) matrix random variable attached to the year i . Next, the aim is to study the asymptotic behavior of the sequence $\{s_n\}_{n \in \mathbb{N}^*}$, its saturation time behavior. We focused on the limit $\frac{1}{n} \log \|s_n\|$. In the first constructed model, the matrices M_i are i.i.d and take two possible values. In this case, the limit only depends on the probability p of the M_i distribution. To study the existence and the uniqueness of this limit, ergodic theory results from Furstenberg and Kingman are used. The limit can also be expressed as an integral with respect to an invariant measure. This expression allows us to prove the continuity of the limit with respect to the probability.