1. Introduction

Population of slow growing, long lived plants like English yew (Taxus baccata L.) typically receive little attention in the past. Due to its inverse, this species is now catalogued as a rare and endangered species in Austria as well as all over the Europe (Thomas and Poulton 2003). The reasons for declination of the yew are refer to the over use in the past centuries as well as unsuccessfull regeneration, tree breaking pressure, illegal cutting and lack of appropriate management strategies (Sverdrup and Magard 1999; Dhar et al. 2006a).

There are two general conservation strategies for slow growing long lived species which are rare and endemic to small geographic areas. The first, more for management (if such species have found on land protection with the goal of protecting established individuals (Carril et al. 2007) and the second, conservation strategies focus on the revitalization of the ecological process which is important to recruitment of new individuals. The goal of these efforts is to promote successful regeneration and increase the genetic diversity (Barrett and Kohl 1993). These two conservation strategies may not be sufficient by themselves if population of slow growing, long lived plants are pricted to be in long term decline (Kestl et al. 2004).

The gene conservation network in Austria was developed as a programme to maintain the biodiversity of endangered species (Aulibe and Schulze 1999). Up to now 13 forests have been selected (Fig. 1 and Table 1) as gene conservation forests with a total area of 232.4 ha. The primary focus of these conservation categories are the in-situ conservation of rare tree species by silvicultural treatments (Herz et al. 2005). There is a limited number of studies on the management of population viability risk in gene conservation forests until now (e.g. Veck et al. 2001, Dhar et al. 2006a). Here we try to find the possible cause on the yew decline and develop (some recommendations for conservation and management of yew populations in Austria.

2. Illegal cutting and Low people awareness

Regulation is an important cause for English yew decline. It has gained considerable importance as a source of anti-cancer drug and high aromatic value of timber. Its tough and long-lasting timber was extensively used for building and its high aesthetic appeal made it a popular decorative material from the ancient time.

3. Competition for light

One of the most important factors that can reduce the number of seedlings is an insufficient amount of light under the canopy trees. The yew is consider to be one of the most shade tolerant tree species in Europe (Thomas and Poulton 2003). It is also mentioned that almost 78{#} of total seedlings from Stiwallgraben come under the dense canopy (29.9 %) while in Leininger Riese it was only 49% of total seedlings. So a dense canopy has the negative effect on growth and survival of seedlings (Sverdrup and Magard 1999). According to tochkalo and Borytynski (2006) yew seedling can germinate soil in very study conditions but their light demand increase with the increase of age. So the total no of sapling in Stiwallgraben was less then the total no of adult, which justify the light requirement of yew seedlings.

4. Loss of genetic variation

Rationale of genetic diversity for abundaces of plants values and among the population component can provide a basis for conservation of genetic diversity of plant programmes (Hemmick et al. 1993). These estimation of allelic diversity can be used as effective diagnostic tool of in-situ conservation measures for plant species. Regarding the English yew some science assumed the low level of genetic variance as suspected reason for decline. In general, continous tree species exhibit high levels of genetic variation. However there was few research were done in this field. In our study English yew population from Stiwallgraben showed low level of genetic variation (Table 4).

5. Adverse soil condition

Soil water relation is an important limiting factors, it can be extremely reducing factor for the seedling survival.

6. Dioecious sexual system and imbalanced sex ratio

Dioecious sexual system increases biological expansion flux constraints created by the lack of availability. It will rise of extinction for smal population. The major advantages of dioecious sexual system is reduce the intense depression of waves (Dart, 1976). The statistics loss of forest via one or other sex function. (Charlesworth, 2001). Balanced sex ratio is highly potential for effective seed production. In our study we have found one case of balanced sex ratio (Leininger Riese) and a second case of imbalance sex ratio (Stiwallgraben) (see Table 4).

Risk of Extinction

Conservation of yew population

On the basis of recent studies and the inventory of yew in different gene conservation forest following recommendation can be formulated for forest management and conservation for English yew populations in Austria.

1. Yew populations with a minimum size of 500 individuals should be dispersed or connected in the landscape to maintain viability.

2. For controlling the browsing pressure, hermaphroditic yew should be excluded from the forest by establishing fence (Dhar et al., 2006b).

3. Predation by rodents should be checked, scientifically.

4. Appropriate light and micro climatic conditions (moderate crown closer of the under storey) are needed to maintain the yew population. To maintain the light availability a continuous selective thinning reducing the competition with other plant species is associated to improve the status of yew population (Sverdrup and Magard, 1999; Dhar et al. 2006a).

5. Soil conditions should be taken into account as soil mixture can be an extremely limiting factor for seedling survival.

6. Genetic variation is of major importance for the survival of populations. In case of less variation artificial regeneration is essential if the population size is small, artificial regeneration could be an important way to increase the genetic variation.

7. Although English yew is a damage tolerant species, stem damage increases the susceptibility of other biotic infections. Yew is notably susceptible to Phytophthora root rots disease (Stirn 1995) and rootİan disease (P. ramorum) (Lane et al. 2004). So, prevention (careful harvesting operation) is essential to avoid damage during tree lifting.

8. People awareness will help to enhance the knowledge and ecological importance about yew (Veck et al. 2001). Regular information and publications might help to increase the level of awareness and improve the overall knowledge about this species in the general public.

If yew trees need to cut it, should be done 25 cm above from the ground as yew can produce more sprouting buds from that origin.

10. The success of yew regeneration should be evaluated by regeneration survey in 5-10 year cycles.

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Table 1. Gene conservation forests in Austria in respect of different age classes

<table>
<thead>
<tr>
<th>Age Class</th>
<th>Total No. of Saplings</th>
<th>Saplings</th>
<th>Saplings</th>
<th>Saplings</th>
<th>Saplings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 15 cm</td>
<td>1118</td>
<td>1118</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15 – 30 cm</td>
<td>1400</td>
<td>1400</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 30 cm</td>
<td>2036</td>
<td>2036</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2. Status English yew population in Stiwollgraben and Leininger Riese in respect of different age class

<table>
<thead>
<tr>
<th>Site</th>
<th>Age Class</th>
<th>Total No. of Saplings</th>
<th>Saplings</th>
<th>Saplings</th>
<th>Saplings</th>
<th>Saplings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leininger Riese</td>
<td>0 – 15 cm</td>
<td>1118</td>
<td>1118</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stiwollgraben</td>
<td>15 – 30 cm</td>
<td>1400</td>
<td>1400</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Leininger Riese</td>
<td>&gt; 30 cm</td>
<td>2036</td>
<td>2036</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stiwollgraben</td>
<td>&gt; 30 cm</td>
<td>1514</td>
<td>1514</td>
<td>0</td>
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</tbody>
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