Practical Tree Care - Pruning of Trees according to the Tree’s Development Phase

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0. Introduction and summary
A tree has to fulfill certain requirements if it is growing close to human habitation: it should not for example pose a hazard to traffic; it should also be healthy and aesthetic. Neither should it grow into traffic space nor too close to buildings. These expectations can often only be fulfilled by applying pruning measures.
Although Germany has issued guidelines on tree care (ZTV- tree care) for over 25 years, many mistakes are still made - which presumably also occur in many other countries - when tree pruning is carried out. Poor pruning can cause damage to a tree and can disfigure it.
Some fundamental elements of tree care with various examples are presented. Also it will be shown how important it is to understand the characteristics of a tree and the way it expresses itself in order to be able to properly recognize what pruning measures are necessary for that particular tree in its own unique location in order to encourage its development, and to maintain or restore road safety.
1. Young tree

1.1 Tree development
After being planted the tree anchors itself in its new location and stabilizes itself to withstand external conditions (as wind). The roots expand in order to absorb sufficient amounts of water and nutrients. The following juvenile phase is characterized by strong growth in order to establish a sturdy crown.

1.2 Maintenance Aims
Once the tree has established itself tree care measures should consist in encouraging the tree to develop a sturdy crown. The tree should also be pruned to provide clearance for buildings and trees.

Pruning measures on a young tree:
   o Cultivation prune / Trimming / Raising

2. Adult Tree / Mature Tree

2.1 Tree development: Development of a stable crown structure, growth phase; the tree continues to extend a) its roots and its crown. In the later part of this phase the lower branches die off due to a lack of light reaching the leaves.

2.2 Maintenance Aims
Pruning measures in this phase should
a) assist the tree to develop a sturdy crown
b) make sure the tree meets the requirements of its location
c) maintain safety

Pruning measures on a growing tree
   o Crown maintenance / Removal of dead wood

3. Old Tree - early phase

3.1 Tree development: The tree slows down its upward growth. The tree’s typical shape is maintained.
The tree has almost finished its upward growth. The tree only puts out short shoots. The tree’s entire energy is used to maintain the shape of the tree for as long as possible. Branches in the lower part of the crown may die. As the tree becomes older the outer regions of the crown are insufficiently supplied with nutrients. The crown dies back and weaker branches die off.

3.2 Maintenance Aims
Maintaining safety is of utmost importance (dead wood should be removed), and depending on the condition of the tree the first step towards a crown reduction can be taken (a thinning of the crown) to let enter more sunlight into the inner part of the crown.

Pruning measures:
   o Removal of dead wood
   o Thinning of crown
4. Old tree - late phase or a considerably damaged tree

4.1 Tree development: The tree tries to maintain its shape by strengthening its trunk and branches. Damaged or weakened branches in the outer crown region may die off. Branches break in inclement weather. Damage to the tree increases as a result of an insufficient supply of nutrients (or due to restrictions caused by man). Fungus is able to enter and cause root, stem or crown decay. If the damage to the roots is extensive the tree could collapse and in a natural surrounding the tree would have come to the end of its lifespan. In cities the tree may be felled. The outer regions of the crown increasingly die off. Unexpected damage to the crown and branches can also be caused by unfavorable weather conditions, for example storms or wet snow. The tree would survive such damage, depending on its vitality, by putting out new shoots and thereby forming a secondary crown.

4.2 Maintenance Aims
The aim in this phase is, above all, to maintain the tree and its safety. It is important to be able to understand the way the tree expresses itself in order to recognize which branches or which part of the crown is at risk of breaking. Timely gentle pruning measures can prevent bigger areas of the crown collapsing and thus causing greater damage. In this later stage when there is a secondary crown, as is often the case with trees that have been topped at some point, due to safety reasons there is usually only one option left and that is to maintain the tree in a reduced form, which means regularly reducing the secondary crown. The crown reduction should usually not be more than 20% of the crown height.

Pruning measures (in corresponding order to the degree of damage to the tree):
- Thinning of the crown (reducing the weight on heavy limbs)
- Crown reduction (reducing the crown by less than 20% of the crown height)
- Crown safety reduction (considerable reduction of crown - often by more than 20%)

5. Tree in old age, last phase – reduced tree - hollow tree

5.1 Tree development: The tree has formed a secondary crown after loss of branches or parts of the crown. If the tree still has a lot of life it can form mighty secondary crowns. In this phase the tree can become “careless”: It continues to put out strong vertical shoots that grow quickly. These vertical shoots can develop into “mini-trees” within the tree. Due to damage where the branches originally broke or have been cut there is a high risk that these “mini-trees” will not withstand winds etc. and therefore these trees may become more hazardous.

5.2 Maintenance Aims
Utmost priority should be given to maintaining tree safety.

Pruning measures (depending on the degree of damage):
- Thinning of the crown (light relief for the outermost regions of the crown)
- Treatment of topped trees (reducing the secondary crown)
- Crown reduction
Difference: Crown maintenance  Thinning  Crown reduction

The text is a summary of the book:
Klug, Peter (2006): Practical Tree Care - Pruning of Trees. Steinen, Germany. Arbus-Verlag
Klug, Peter (2007): La cura dell’ albero ornamentale in città. Blu Edizioni, Torino