

# *Pruning*



*Good practices in agriculture: social partners participation in the prevention of musculoskeletal disorders.*

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# Introduction

*Pruning occurs in many agriculture applications for two major purposes. First, to train shoots and branches in the required direction and second, to generally remove unwanted foliage and branches. The first operation usually has to be done to a high degree of accuracy, whereas the second can be done in a less precise way.*

*There are many tools that can be used to do the pruning, ranging from simple hand secateurs to sophisticated tractor-mounted equipment. Manual pruning shears are often preferred by workers due to better hand comfort, freedom of movement and considerations of safety. However, high force demands of the forearm muscles are found which may cause repetitive strain injuries (RSI) of the hand/wrist. Besides hand/arm problems, low back pain also often occurs, which may be caused by reaching upwards and/or forwards.*

*This brochure will focus on hand tools and hand-held equipment because of the associated risks of musculoskeletal disorders (MSD). To reduce the physical effort of the worker, also powered and tractor-mounted equipment are considered. In the following examples some good practices for reducing the risk of MSD are presented:*

- Pruning tall trees
- Pruning low trees or plants

*After this, an overview is given for the principles for selecting the correct pruning tool. Also some recommendations are presented on how to practise correct working techniques.*

*This brochure does not claim to cover comprehensively all the possible good practices to alleviate or prevent MSDs during pruning, but is the result of visits and meetings with farmers and commercial growers. There is no affiliation to commercial organizations or products in presenting these good practices.*

*We would like to thank all the farmers and growers that collaborated with us in this survey and we hope that all other farmers might learn from these practices to prevent musculoskeletal disorders in the future!*

# 1. Pruning tall trees

*In pruning the worker adopts a number of different postures. When pruning tall trees the work, carried out either from the ground or on a ladder, may be characterised by: lifting arms at or above shoulder height; extension of the neck; and/or bending/twisting of the back.*



## Solutions

### Ladder



*As for harvesting, a small light-weight ladder allows a good working posture if used properly.*

*The safety rules when using a ladder have to be observed to avoid excessive reaching and acrobatic postures:*

- *always have contact with two feet on the ladder*
- *step up and down the ladder facing forwards*
- *try to hold the ladder with at least one hand as much as possible, with two hands to step up and down*
- *no excessive bending to the right or left side, work as close as possible*



*If however larger or higher movements have to be made, it can be better to use a specially designed tool with a long handle than standing on a ladder to avoid too far or too high reaching (see also long handles in the section below).*



*A ladder can even be used to have a sitting posture for a while and thus reduce sustained standing static postures and raising the arms too high.*

### **Aerial work platforms**



*These examples demonstrate a convenient and safe way of lifting workers to the required working height.*

## 2. Pruning low trees or plants

Pruning of trees or plants at a lower level cause a lot of bad back postures: extreme flexion of the back, often combined with rotation or twisting. Take the pruning work at the vineyard as an example. Probably the most undesirable task of the vine grower is winter pruning. This involves cutting the long, dry vines to allow for new growth and cutting around new shoots to encourage growth in a particular direction (also called training). For accuracy reasons, this has to be done manually, since the pruner has to make many decisions on how s/he wants the plant to develop and grow. Although some tools have been developed which make the pruning easier (see below), the back will usually be flexed to some extent.



### Solutions

#### Plants at waist level



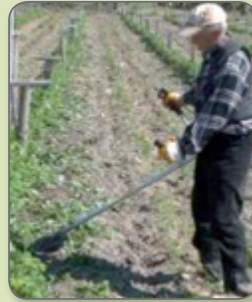
Growing plants at waist level allows the worker to adopt a more upright posture. In this example, the pruning posture is relatively easy. The tools used are simple secateurs, scissors or a knife with a sharp blade (as shown below).

### *Cart in the vineyard*



*Bending of the back is (mostly) reduced in a seated position. This cart can only be used when the ground conditions permit it (not too soft, not too uneven, etc.).*

### *Long handles*



*Long handles enable workers to reach greater distances while keeping a normal posture. Two hands are used which increases the power and shares the strain on both arms and hands.*

### *Growing systems*



*Especially in the vineyard, there are different methods of training the vines (also called trellis systems). The method selected at a vineyard seems to be a combination of personal choice and what would be regarded “best” for the variety. But from an ergonomics point of view, the type of trellis system plays an important role. An optimal system may be designed to arrange shoots to grow along guide wires that are at a preferred height for the stature of the typical vineyard worker. Nevertheless, consideration must be given to the needs of the maturing grapes (regarding temperature, ventilation, ...).*

## *Machine pruning*



*If no systematic cutting of stems or branches is required because no precision is needed, it may be better to use a powered hand-held cutting device. It is common for such devices to be fitted with longer handles to increase the worker's reach.*

*But such tools are heavier and more awkward to control. It is usually helpful if the weight of the tool can be partly carried by straps around the waist or shoulders.*



*The cutting can also be done with a hedge-cutting machine, usually mounted on a tractor.*



*Alternatively, purpose-made automatic leaf-removers can be found in vineyards and olive orchards.*

### 3. Tools selection

*Both during pruning of high and low trees, awkward postures of the hand and wrists often occur. Use of non-ergonomically designed tools can aggravate the strain on the joints and cause local pressure on the hand.*

*In the earlier days a knife was used for the cutting e.g. in the vineyard. Hazards are obvious, as there is no solid surface against which to place the vine, shoot or stalk and frequent cuts to the fingers and other limbs are likely to result.*



#### Solutions

*The key principle of tool selection is to avoid unnatural wrist postures by choosing a tool in which the awkward angle is accommodated in the tool design.*

*Other considerations include:*

- *blade size.*
- *spring tension (for secateurs)*
- *choose left or right handed (where available).*

### *Rolling handles*



*Apple pruning using secateurs where one of the handles has an outer surface which can rotate as the worker's grip draws the two arms together. This decreases the strain on the fingers and hand.*

### *Long handles*



*Use of a pruning clipper or lopping shears with long handle. This long handle avoids the need to kneel or squat at ground level, but does not necessarily guarantee that a good back posture is adopted.*

### *Manual pruning shear with a reversed grip*



*A shear with a reversed handle grip is suggested to reduce local pressure and fit to all hands. However, the exposure to shocks may still be undesirably high.*

### *Manual pruning shear with angled blades*



*This provides a better wrist posture at lower levels. The wrist can adopt a more natural position, because of the angle in the handle.*

### *Pruning saws with angled handle*



*Pruning saws with a short handle work the fastest and feel the most stable and accurate. An angled handle allows a higher force exertion. However there is often less freedom of movement.*

### *Powered tools*



*Using secateurs, pruning shears, lopping shears or saws, may still demand some force with very high repetition. Therefore powered secateurs are recommended. In this picture of the vineyard, the secateurs consist of a trigger operated cutter and a back-pack for carrying the battery (may be uncomfortable for workers already suffering low back pain).*

## 4. General advice for pruning

*Pruning tasks are often highly repetitive and associated with difficult working postures and movements, strenuous and static muscle loads. It is important to prepare for the physically demanding work and to help prevent musculoskeletal disorders by being physically fit, well-trained and knowing how to practise correct working techniques. Learn how to practice correct working techniques so they become natural for you*

- *Keep your body in good trim by regular physical exercise*
- *Do not use more muscle strength than the task requires*
- *Warm up and stretch your muscles before and after the working shift*
- *Alternate work tasks with your colleagues and take short breaks - often*
- *Work near your body use both hands or alternate, and avoid extending your joints to more distal positions*
- *Make proper use of the tools: provide several types of tools and use the right tool for the right job*
- *Use support e.g. on the ladder or against a tree*

*Clippers should be kept well lubricated and blades sharpened frequently (be careful of cuts from contact with the open blade).*

# General information

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*Goal of the project is to implement the European social partners’ agreement of GEOPA-COPA and EFFAT by developing prevention policies and good practices to reduce musculoskeletal disorders in agriculture and to disseminate the results. For the following tasks good practices are presented:*

- *Milking cows*
- *Tractor driving*
- *Ground level manual crops*
- *Pruning*
- *Sorting and packaging*
- *Harvesting*

***For more information on the project: [www.agri-ergonomics.eu](http://www.agri-ergonomics.eu).***



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