

# How to grow winter wheat? The Fukuoka-Bonfils method

Winter wheat is normally sown in September-November and grows just a little before going dormant in winter. The winter cold triggers flowering. After the floral initiation in January, the plants develop a number of tillers and are finally harvested in August.

There are a number of drawbacks in growing winter wheat the conventional way. As the plants are still small at the onset of winter, soil erosion is high. Tillering takes place in February-March when temperatures are sub-optimal for this physiological stage of plant growth. The plants are vulnerable and require numerous treatments against weeds and fungi. The frequent tractor passes over the land lead to compaction and bad aeration of the topsoil.

## Marc Bonfils' method

Is there an alternative? Can we regenerate our soils and still grow the food we need? Marc Bonfils has experimented with alternative cultural measures in the region of Beauce, France, for many years and has developed a system that embraces the general principles of permaculture. Although Bonfil's method is primarily for wheat, it is easily adaptable to other cereals. Bonfils found a way of growing food without

ploughing in the European climate, as Masanobu Fukuoka did in Japan.

At the end of June - much earlier than in the traditional way - wheat is sown, or rather *pressed* into the soil at a spacing of 60cm, through the carpet of spreading perennial clover, previously sown in April. The clover cover assures Nitrogen fixation, better bacterial life, and development of algae that are also capable of fixing Nitrogen. During its long vegetative period the wheat plant makes deep roots before winter sets in, thanks to better availability of nutrients and greater bacterial activity. This gives the plants a head start for the next summer. Yields of over 15 tons per hectare (6 tons per acre) have been obtained in this manner. A comparison of some parameters:

	Conventional	Bonfils
Plants/m	350	1.5-4
Ears/plant	0-3	100-150
Earlets/plant	12-15	35
Grains/ear	20-30	40-60
Weight of grains	Low	High

Even before harvesting of the ears, the new wheat crop is already pressed in through the clover carpet amongst the maturing

'bushes' of wheat. Clover is a perennial: it is not sown each year but simply cut down at the beginning of the season, at a height that does not damage the wheat plants.

After harvesting in August, the straw and chaff are returned to the field. In this method, tillage is reduced to a bare minimum, avoiding practices like ploughing and compaction that retard the process of revitalising the soil.

## Advantages

The optimal temperature for tillering is 20-25°C. In Bonfils' method, unlike in the conventional, tillering starts already in August of the year of sowing, when temperatures are closer to the optimal. A better root system develops and a better plant stand is obtained, reducing leaching of nutrients in winter. These bigger plants appear to resist the cold better than young seedlings. With a wider stand, much more tillers are produced, each tiller leading to an ear. The tillering period starting in August is much longer than with the conventional winter wheat growing method.

## Problems

The main danger lies in the wrong choice of variety: if a strictly winter variety is not used, then the plants will go to grain before winter, producing less than the standard methods. Most modern varieties, being hybrids between winter and spring or warm-climate types, have this tendency. Therefore, one should seek long-straw, traditional varieties, with strong vegetative vigour that gives plenty of side-shoots and dense foliage.

Mechanical harvesting constitutes a problem in the Bonfils method, as harvesting takes place amidst young, vulnerable seedlings. Cutting should be at least 5 cm above the soil.

A problem of the wheat-clover association is that the wheat grows too tall because of the richness in soil Nitrogen. Sowing wide, permitting maximum sunshine and thus reducing the risk of lodging of the wheat, can counteract this.

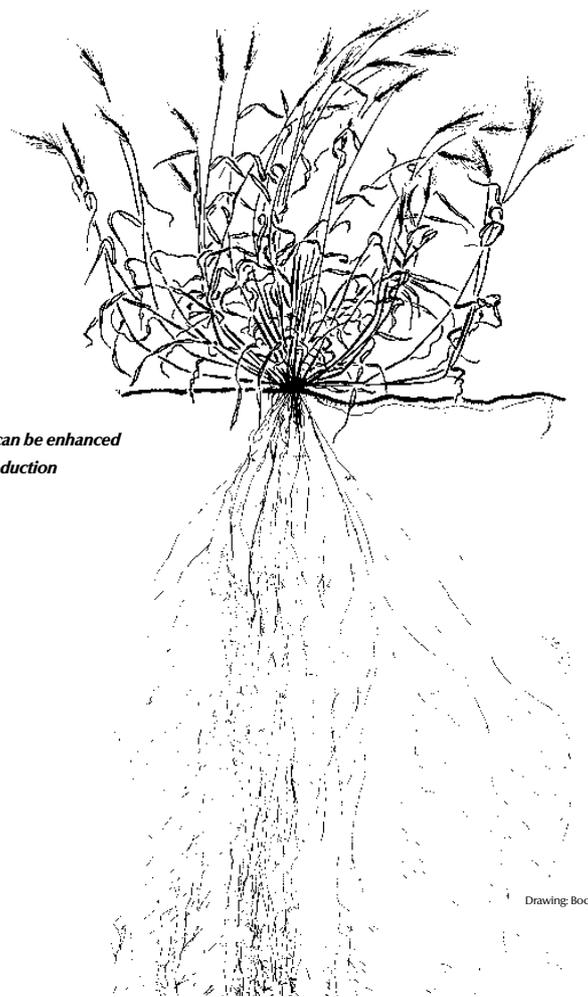
## Adapted from

- Marc Bonfils. *Le blé d'hiver et sa physiologie végétale selon la méthode Fukuoka-Bonfils*. Permaculture Pyrénées. Association las Encantadas. B.P. 217. F-11300 Limoux, France.

- Marc Bonfils. *The harmonious wheatsmith: can we regenerate our soils and still grow the food we need?* Permaculture Association, Old Cuming Farm, Buckfastleigh, Devon TQ11 0LP, UK.

## Similar experiences are presented in:

- Sayre KD, Moreno Ramos OH. 1997. *Applications of raised-bed planting systems to wheat. Mexico*. DF (Mexico): CIMMYT. 36 p. Series: CIMMYT Wheat Special Report (WPSR) No. 31.



Tillering in grain crops can be enhanced to increase production

Drawing: Bockemühl, 1980.