Innovative vine stakes

The vine stakes made of wood were used over a long period of time. The stake parameters were chosen empirically: diameter – 5 cm, height – 200 cm, depth of fastening in the soil - 50 cm turned out to be optimal. Such stakes are successfully used up till now for fastening of the vineyard supporting systems. Exploitation expenses for maintenance of the vineyard along with other factors greatly depend on durability of supporting systems of fastening. Good working order of a fastening system implies to retain:

1. Steadiness of stakes in the soil – i.e. vertical position of stakes (stakes must not be warped);
2. Intactness of an above-soil part of stakes – the stakes must not be damaged or broken.

In the last century they began to manufacture stakes from reinforced concrete, steel with non-corrosive or zinc coatings and other materials, whose durability is significantly greater than that of wooden stakes. In spite of the fact that for stakes were used materials whose strength was greater than that of wood, their sizes were left unchanged. For instance, at present they supply the market with steel stakes with non-corrosive or zinc coatings: tubular with a diameter 5 cm and wall thickness 0.15 cm; square and rectangular with cross sections 5x5 cm, 5x4 cm, 5x3 cm and wall thickness 0.15 cm; reinforced concrete square with the cross section 5x5 cm.

For ensuring steadiness of stakes in the soil it is necessary to retain sizes of wooden stakes. This favored disposition of steel stakes being in exploitation with sections 5x4 cm and 5x3 cm in parallels to the row with 5 cm side.

The state of above-soil part of stakes is different. Steel stakes with a section 5x5 cm and wall thickness 0.15 cm have 4-times greater strength than wooden stakes with diameter 5 cm. This favored manufacturing rectangular tubular stakes with cross sections 5x4 cm and 5x3 cm whose strength is equal to that of the wooden stake.

At load of a wind on the vineyard trellis, an above-soil part of the stake is subjected to deformation of bending. This deformation is maximum when the wind blows perpendicularly to the row and deformation is minimum when the wind blows in parallels to the row. It is known, that elastic section modulus of the stake is proportional to square of width of that side of the stake which is perpendicular to the row (Fig.1.,pos.1). Hence, taking into account that the load acting on the stake is unilateral, a rectangular section disposed with greater side perpendicularly to the row, can be considered optimal for the stake above-soil part. For example, steel stake 5x3 cm should be disposed with its 3 cm side in parallels to the row and with 5 cm side perpendicularly to it (Fig.1., pos.2). In this case strength on bending of the steel stake with cross section 5x3 cm is 2.5-times greater than that of the wooden stake.

Unfortunately such stake will be unsteady in the soil and it will fall at load of a wind. The problem is eliminated by the patent of Georgia N p5181. On the base of the patent an under-soil part of the

stake is equipped with the element ensuring steadiness. Namely, sheets of non-corrosive material with sizes (5x0.15x50) cm are rigidly fastened to the sides of under-soil parts of stakes, disposed in parallels to the row (Fig.2).

It is not necessary that sheets ensuring steadiness be of one piece and disposed on one side. Their parts can be disposed on the opposite sides.

The mentioned construction of a stake enables to decrease by 20-25% consumption of materials: reinforced concrete, steel coated with non-corrosive materials or zinc, having circular, square or rectangular cross sections of the above-soil part at conditions ensuring steadiness and retaining its durability.

The given proposal becomes more important considering the fact that increase of height of the vineyard trellis takes place that correspondingly requires steadiness of the supporting system and increase of the stake sizes.

Therefore, the offered construction enables to choose a cross section of the stake above-soil part taking into account load of a wind and for steadiness in the soil, to fasten rigidly on an under-soil part a sheet of stainless steel or polymer material, whose sizes are determined according to the soil categories.

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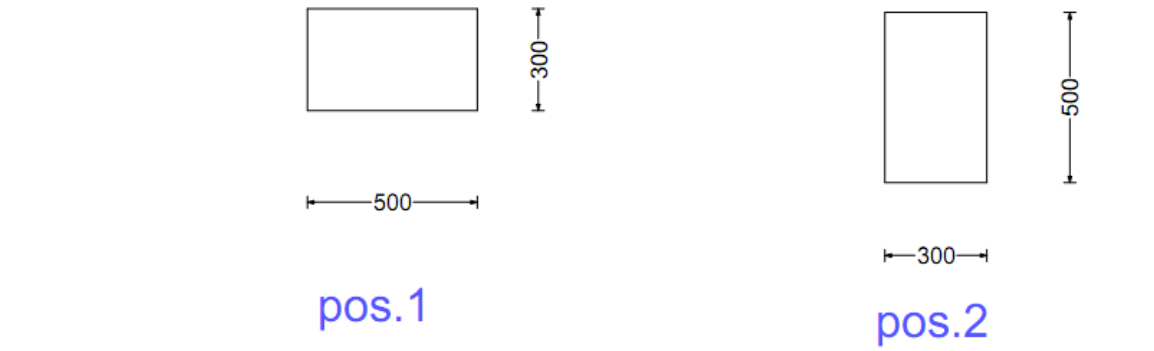

fig. 1

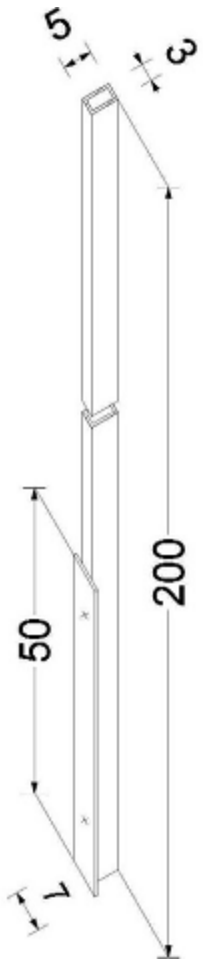

Fig.2