

# Device for automated attachment of the supporting wires in hop-growing

(J. Portner, Z. Gobor, G. Fröhlich, T. Kammerloher)

## Traditional method of the wire attachment

In Germany, the Hops are cultivated exclusively on high trellises with a predominant height of 7 m. 1.2 – 1.4 mm thick iron wire is used for supporting strings, which need to be replaced annually by attaching them to the cable mesh of the trellis above the hop rootstocks.

On bigger farms this work is carried out already in October, because of the comfortable wetter conditions, good trafficability in the field and still available seasonal workers engaged during the harvest. Two to three workers attach approximately 4000 pre-cut wires per ha staying on a platform mounted on a front-end loader of a tractor, whereas a tractor driver drives the tractor forward with a low speed.

Considering the accident risk and the intent to avoid soil compaction, this task can be carried out under good trafficability conditions within the field, i.e. either the soil surface should be waterless or frozen. Due to this fact on the most of the farms the attachment of the supporting wires takes place in winter, when the temperatures are low and the soil frozen. The coldness and the accident risk are considerable threat for the health of the involved workers. On light soils and on smaller farms the attachment of the supporting wires can take place in spring too.



## Automated attachment of the supporting wires



The Institute for Agricultural Engineering and Animal Husbandry of the Bavarian State Research Center for Agriculture and the company Soller GmbH developed a device for automated attachment of the supporting wires in the frame of a joint research project. The system is controlled by one operator.

A special mechanism feeds the supporting wire from a wire coil positioned on the rear of the tractor, over an intermediate storage to the subsystem for wire attaching placed on the top of the carrier mounted on the front-end loader of the tractor. The subsystem for wire attaching traces along the longitudinal cables controlled by sensors and ties the supporting wires to the cable on defined distances whereas the tractor moves forward. After attachment the supporting wire is fed from the intermediate storage and cut on appropriate length before the next wire attaching sequence starts.

The operational time of the automated attachment of the supporting wires with currently 5 – 6 h/ha have to be considered rather too long, but the total labour input of 12 h required for manual wire attachment with 3 workers on the platform has been reduced by half.

### Granted within the innovation support program:

German Federal Ministry of Food, Agriculture, and Consumer Protection (BMELV), Project promoter: German Federal Agency for Agriculture and Food (BLE)

### Project partner:

Bavarian State Research Center for Agriculture (LfL)-Institute for Agricultural Engineering and Animal Husbandry, Vöttinger Str. 36, 85354 Freising (Germany)

### Cooperation:

Soller GmbH, Geisenfeld (Germany)