

British lawn mowers across Europe

By Paul Schmit

Since 2011, the European network **Schaff mat Päerd** (work with horses) have been testing modern horse drawn equipment. Registered as a non-profit organization in Luxembourg, its primary goal is to generate synergies about modern technologies. Not only the own developments of new implements and harness components are tested, but on request, the electronic datalogger-based measuring equipment, and the complete computerised data analysing are also provided for others.

Until now, most of the joint projects have been realized in Belgium, France, Germany, Italy, Switzerland and mainly in Sweden. One of the ongoing projects is the testing of gang mowers converted to workhorse use. The first trials were made in May 2016, on request of the three Swedish workhorse companies Blomberg, Thomsson and Gustavsson, in Malmö.

Sweden is a role model on European level, not just in sustainable forestry by horse logging, but also in the use of workhorses in municipalities. To promote this environmentally friendly energy source and to support the renaissance of the workhorse, a so-called brukshästcentrum (work horse centre) acts as a link between professional horse companies and local councils. Furthermore, a two-year workhorse driver education in

a dual training system, based in Wången, one of the three national horse centres, ensures that well-trained youngsters can move up.

Beside forestry, a widespread use of workhorses in Sweden is lawn mowing. In the past two decades, several joint import actions brought many horse drawn reel type gang mowers from US to Sweden. Contrary to popular belief, these implements are not purely Amish made, but the cutting units are of Chinese or Indian origins. It proved very quickly that this machinery is very well suited for maintaining the lawn at home, but not for daily professional use. The main problem were the plastic wheels with solid rubber tyres, which lose traction very quickly, especially on wet grass and even spin on the rims if the required drive torque is too high.

This prompted two Swedish horse drawn equipment manufacturers to design their own lawn mowers, mostly based on British Ransomes units. During the comparative trials on the grounds of the former Malmö Bultofta Airport in May 2016, three different mowers from Hellman of Herrljunga were tested. The aim of these test series was to determine the daily workload of a pair hitch in relation to various working conditions and three different machines.

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After the City airport was moved in 1972 from Bultofta to Sturup, located outside the city nearly halfway between Malmö and Lund, most of the ground at Bultofta was converted into a city park. A part of this recreation area is maintained each year during the summer with workhorses. The contracts are renewed from year to year and according to the contract conditions, the lawn must be kept at a height of 3 to 7 cm. During wet summers, which require frequent cuttings, two pair hitches find full-time work, usually for four days a week, at the Bultofta park.

By their simplicity of design, requiring low maintenance, the horse drawn mowers are an efficient and productive way of mowing these larger open areas of grass. In addition to the attraction of the draught horses, visitors to the park also admire the noiseless and environmentally friendly work.

With a working width of 2.15 m, all three tested mowers were of the 3-gang configuration with a platform for the teamster. All cutting cylinders featured 6 knives with 203 mm (8") diameter. At the day of the trials, the turf stood at a height of 7 to 9 cm and was cut to a height of 3 to 4 cm.

Three draft force sensors allowed to measure the draft forces of both horses separately on their singletrees and in total on the eveners, to also evaluate the efficiency of the pair hitch. For all three mowers, the required tractive effort was determined as

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(1) Swedish Ardennes gelding Loke on a Ransomes Magna mower. (2) Swedish draft trotters Pivo and Duvel on a mower with triple Ransomes units.

moderate for both horses, with draft force values ranging from 0.3 to 0.82, kN depending mainly on the ground conditions. Only the mower #2 showed significantly higher values, resulting from the transmission system. Contrary to the other two mowers, which consist of original Ransomes and Jacobsen ground driven units, this much heavier built machine uses cutting units, which were initially powered by tractor hydraulics. For horse use, a more complex, and by that less efficient,

transmission system is necessary on this machine to ensure the required drive rpm. For the driver's comfort, the mower #1 was retrofitted by Niklassons, another Swedish equipment builder for workhorses and ATV's, with a battery-operated pneumatic system for lifting and putting the cutting units in gear. The other two mowers were fully hand operated.

In order to meet the real working conditions as much as possible, the mowing on the test track of 300 m was not only







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done in a 120 straight line on the plain and on a 25 m long slope, but also in a small and a large eight with 6 and 12 m radius. Given that all three mowers tested in Malmö had different degrees of wear, a detailed comparison of the different cutting units proved to be difficult. For this reason, the Schaff mat Päerd association started in 2020 with another test series with only single units in a one-horse hitch, to better evaluate the functional differences.

The history of Ransomes, based in Ipswich, in the mower manufacturing can be traced back to 1832. Nowadays the company continues as Ransomes-Jacobsen Ltd. as being bought by the US conglomerate Textron in 1998. With Lloyds & Co. Ltd of Letchworth there still exists another, purely British and still privately owned, gang mower manufacturer in UK, which was founded in 1878 and started, after importing first US mowers, their own production in 1934. The cast company's name and place of origin in the cast ductile iron gearboxes of their ground driven mowers still testify to this past.

In fall 2019 were ordered at RTM Machinery of Aylesbury a brand new Lloyds Leda Giant mower unit and, as Ransomes ceased the production of the ground driven gang mowers in July 2019, a completely overhauled Ransomes Magna unit. During winter 2019/20 an adapter kit with stainless steel Scandinavian style traction shafts was designed and manufactured which can be clamped on the steel cross shafts of both mowers without any changings. This permits to carry out comparative trials under identical conditions. The adapter was based on the original Lloyds towing bracket with its ingenious lifting device for the cylinder, including a spring-loaded locking pin preventing the cutting unit swinging during transport.

The test series of the single mowers started in April 2020 in Tuntange (Luxembourg) and are still ongoing. The test areas are the green areas around the author's farm as well as a few meadows, after the first hay cut, where easily reproducible test conditions are ensured. Contrary to the measuring setup used in Malmö, where the draft force sensors were mounted on the evener, here two sensors are mounted in the harness between the front tug straps and the central tug rings of the Swedish Värmland type harness. This allows to evaluate, besides the required tractive effort of the implement, also the balance of the left/right side forces on both shoulders of the horse. The datalogger is saddled on the back pad.

The cutting height is set between 30 and 40 mm, depending on the grass height. Lloyds as well as Ransomes recommend a

(3) Swedish draft trotters Pivo and Duvel on a mower with triple, originally hydraulic driven, units. (4) Swedish draft trotters Pivo and Duvel on a mower with triple Jacobsen units. (5) Measuring setup for the trials in Malmö. (6) Swedish Ardennes gelding Loke on a Lloyds Leda Giant mower. (7) Adapter kit for single horse hitch mounted to the Lloyds Leda Giant unit.

cutting height of 19 to 76 mm for their Leda Giant and Magna units, which are mainly used for longer grass in park maintenance. Units of both manufacturers with smaller cylinders turning at higher rpm are mostly used for shorter cutting heights and a finer finish at turf areas.

On the Lloyds, as well as on the Ransomes mower, the cutting cylinders are made of forged high carbon chromium steel. The same counts for the bottom knife. With 6 blades on the Lloyds mowers, this needs a lower rpm to achieve 28 cuttings per m, compared to the Ransomes mower, which attends 27 cuts per m with just 5 blades. The cylinders on both mowers measure 254 mm (10") in diameter and 760 mm (30") in width.

On the Lloyds mower, the adjustment of the cutting height is done on the rear roller by a notched bracket whereas the Ransomes uses a hole plate for this purpose. On both mowers, the rear roller consists of steel tubes running on replaceable ball bearings with lubrication. The Lloyds mower is switched on and off by turning spring-loaded rotary heads on the outside of both rims. This is solved more elegantly on the Ransomes mower, where it is operated via levers, easy to use, on both inner gearbox sideplates. As standard, the Lloyds mower runs on semi-pneumatic tires of 508 mm (20") diameter, whereas

the Ransomes mower can be fitted with pneumatic tires or steel wheels of the same diameter. The weight of the Lloyds mower was measured to 129 kg and the one of the Ransomes to 102 kg.

Despite the technical differences, which can be found on both mowers, it proved, until now, that the two mowers don't give each other much in terms of the required tractive efforts. The horse's effort can be rated as moderate. This fits to Ransomes own indications of 100 kg as initial pull and 50 kg in work. Both mowers work flawlessly also in higher grass up to

25 cm height. However, too much withered clippings from the previous cut can block the cylinder. On the higher grass, two passes in opposite directions helps achieving a nice cut.

A detailed 12-page test report will be published in fall 2020 and can be ordered on the webpage of Schaff mat Päerd or read in the winter issue of the Small Farmer's Journal from US as well.

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