

**VÄDERSTAD®**

# BioDrill



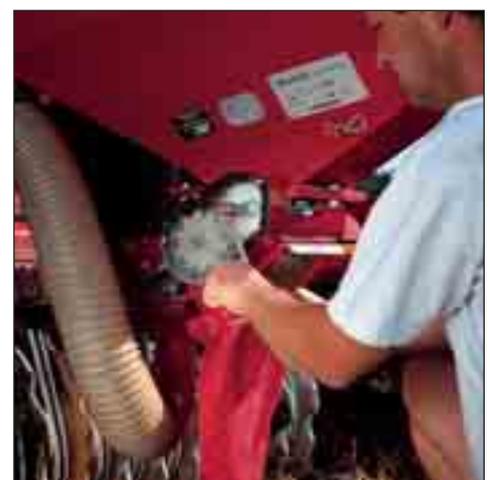
With Väderstad's flexible BioDrill hopper for small seed on a Rexius-/Rollex roller or Carrier, leys, catch crops, oilseed crops and other small-seeded crops can be drilled while the soil is being tilled. This saves passes, time and costs and further improves the performance of Väderstad machinery. The seed rate is easy to adjust and is very accurate from 1 - 30 kg/ha. Seed distribution is also very uniform. BioDrill can be easily fitted to or removed from a wide range of Väderstad machinery. A version of BioDrill can be fitted on the large Rapid seed drills as an extra grass-box for undersowing e.g. a ley or catch crop at the same time as the main crop is being drilled. The uniform seed distribution of the BioDrill is produced by the hydraulic fan, which blows the seeds out with high capacity. Speed of the hydraulic fan is easily adjusted from the tractor cab.



The seed hopper has a huge 360 litre capacity and is placed low for ease of access during refilling. It is also easy to empty out excess seed after drilling. The design of the hopper allows it to be completely emptied.



The small seeds are metered out by Väderstad's own tried and tested Fenix system, which allows very precise setting of the seed rate from 1 - 30 kg/ha. It has been shown that the seed distribution produced is very uniform across the entire working width.



Calibration takes a few minutes. The test bag is pushed up under the Fenix housing through a spring-loaded vent:  
1) Make recommended turns and weigh.



**different purposes**



2) The weight of seed multiplied by 100 gives the seed rate in kg/ha. With all Väderstad seed drills, a drilling precision kit is supplied as standard. It includes weighing scales and a test bag – everything needed to carry out a quick and simple calibration in the field.



The Fenix system is easy to adjust and the seed rate can be increased/decreased easily even with a full seed hopper. The viewing window on the front clearly shows how much seed is left in the hopper. This means that it can be drilled out down to the last few grams.

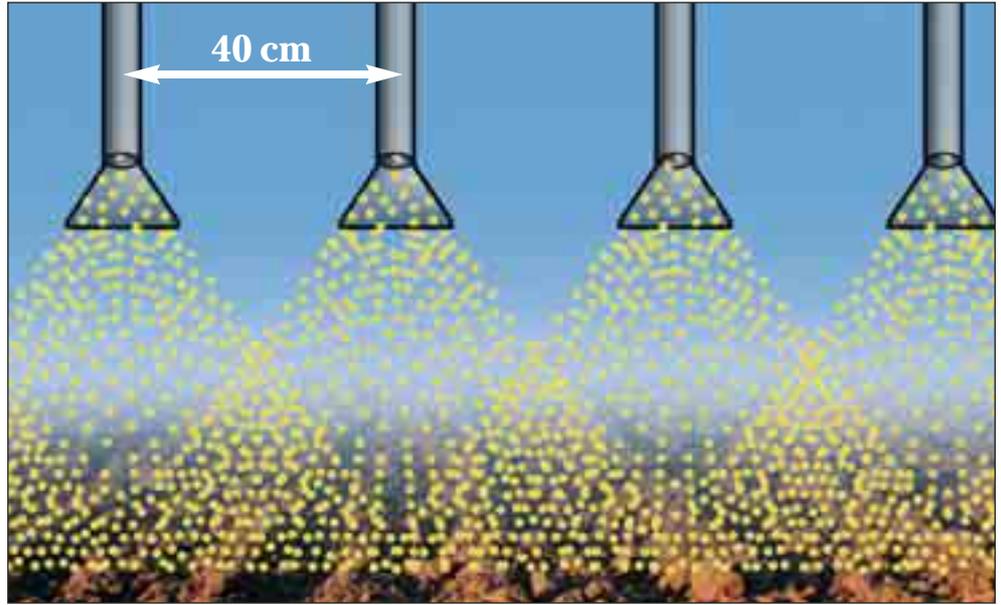


There are two alternatives for controlling the BioDrill: The Control-Switch for switching drilling on or off, or Control Station-Bio (electronic box) which also shows the actual fan rev count and has rotation, tramlining and seed level sensors.

# Uniform seed distribution



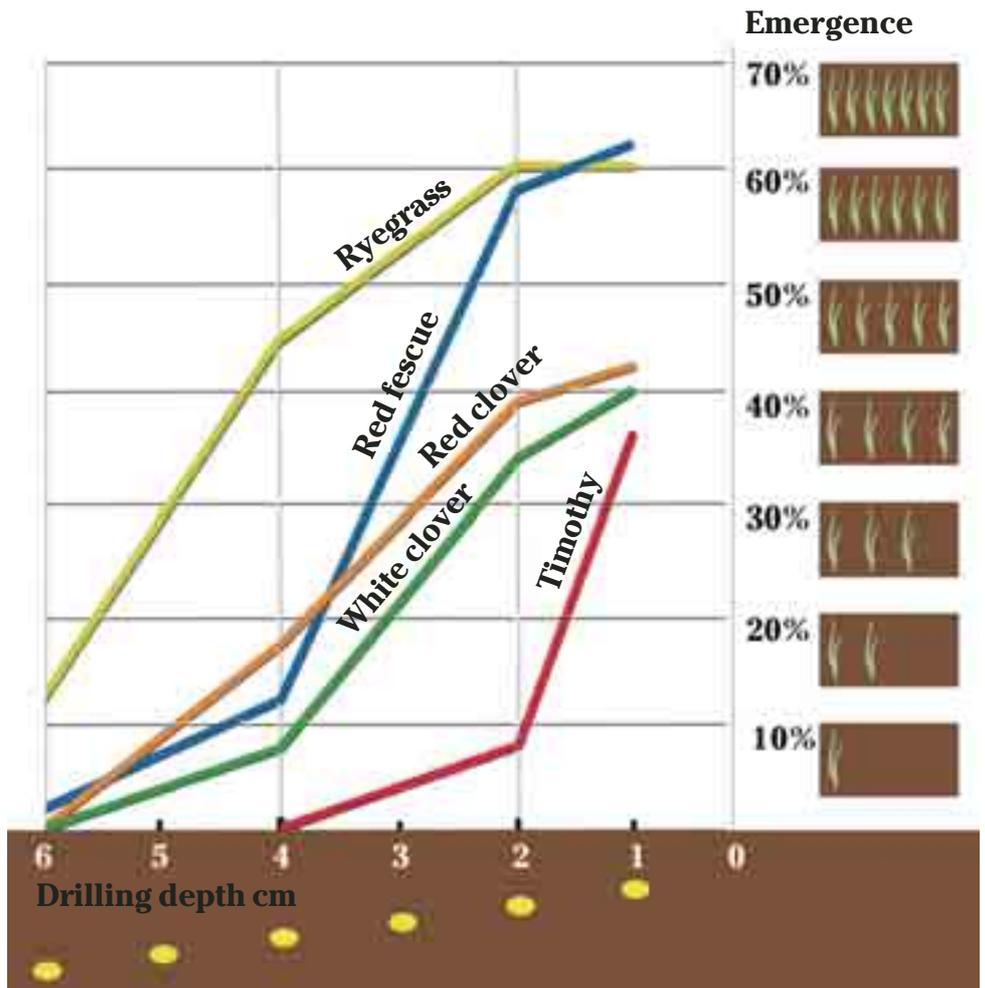
The seed is broadcast by broadcasting plates that distribute the seeds in a uniform spreading arc. The broadcasting plates give the seed a uniform distribution across the entire working width.



Seed distribution and drilling precision is good. The spreader nozzles are closely positioned at 40 cm intervals, which ensures uniform seed distribution across the entire working width. The double overlapping guarantees uniform spreading.



A general rule of thumb for setting the drilling depth is approx. 10 times seed diameter. If the seed is placed too deep, the shoot will not emerge, regardless of the amount of seed drilled. The smaller the seed, the



shallower drilling depth has to be for the shoot to reach the soil surface. For example, timothy seed, which is very small, does not emerge at all if placed at 4 cm depth, while emergence is only around 35% at 1 cm drilling

depth. Ryegrass, which is a larger seed, is less susceptible – at 6 cm drilling depth emergence is around 10%, while at 1 cm depth it is 60%. Source: Nordestgård, A. 1980 & 1983, Denmark.

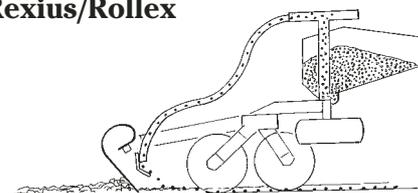
# Good seed covering



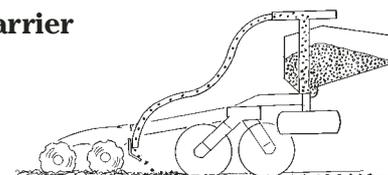
## BioDrill on Carrier, Rexius and Rollex

With BioDrill on Carrier, Rexius and Rollex, the seed is broadcast behind the tillage implement and is covered by the roller at 1 - 3 cm depth. In trials, drilling a ley using a grass box on the roller has produced very good results. In this way, the number of passes can be reduced to the minimum, which means that soil moisture can be used more efficiently by the seed. Emergence is astonishingly good and establishment is simple and cost-effective.

### Rexius/Rollex



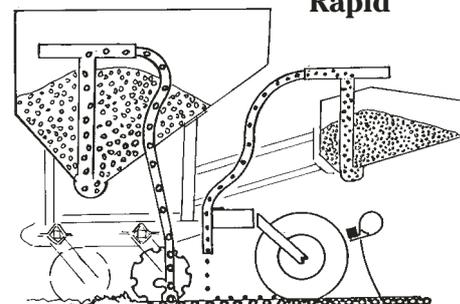
### Carrier



## BioDrill on Rapid

With BioDrill on Rapid, the seed is broadcast onto the soil surface and covered by the wheels and the following harrow. Trials on crop establishment have shown that Rapid drilling of ley seed together with drilling of the main crop works very well. In many cases, the seed rate can be reduced.

### Rapid

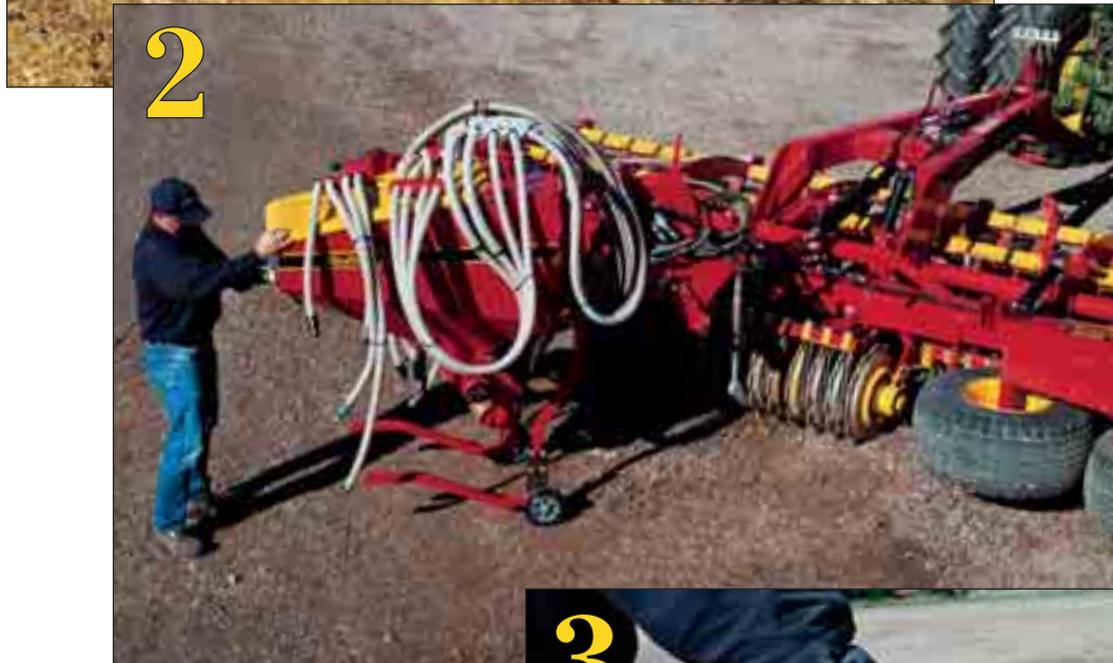


# From powerful soil tillage to pro



1

1. Powerful soil tillage of stubble or furrow. When volunteer seeds and weeds have germinated, it is time for a second pass. With BioDrill on the machine, a small-seeded crop can be drilled at the same time.



2

In a few simple steps, the Rexius and Rollex can be converted from powerful soil tillage implements to precision seed drills.

2. BioDrill is simply wheeled up to the machine on a specially designed carriage. The hopper is attached to the implement by two pins. Hoses and hydraulics have quick-coupling connections.



3

3. Seed hoses are laid out and easily attached to the broadcasting plates.

4

4. The operation is complete!



# precision drilling of small seed

7. All that remains is to make a second tillage pass, while at the same time cost-effectively drilling e.g. an intermediate crop, ley or oilseed. **Surprising versatility.**



moves, Carrier, x can be transfor-  
erful soil tillage  
accurate small  
drills



6. The required drilling depth is set before starting and a calibration test checks the amount of seed being metered out. The calibration test only takes an instant.

5. The hopper has a low refill height and is easy to reach.

# Tillage and drilling



## Rexius and Rollex

With BioDrill on the roller, it is simple and cost-effective to drill a crop while rolling in the spring. The seed is spread by broadcasting plates behind the Crossboard. The spreading pattern and seed covering action are very good.

**Roller drilling is suitable for undersowing a catch crop, a ley into cereal in the spring or for repairing a ley in the spring during rolling. In this way, the life of the ley can be extended, so establishment costs can be reduced dramatically.**

Roller drilling is also cost-effective on set-aside. Instead of letting set-aside land develop into a mass of weeds, it is now possible to drill a ley mixture for nitrogen supply and biological loosening of the soil, or a wildlife seed mixture for game cover.

The picture to the right shows seedlings of a first-year ley undersown by BioDrill. With roller drilling, it is easy to repair leys regularly during rolling. This prevents patches developing and extends the life of the ley.



# in a single pass



## Carrier

On Carrier with System Disc, the broadcasting plates place the seed behind the cultivation discs. The seed outlets are only 40 cm apart, which guarantees a uniform spreading pattern. The seed is metered out with high precision and is covered by the roller. Carrier drilling with BioDrill works well for esta-

blishing an intermediate crop during stubble cultivation. Trials with mustard and fodder radish have been set up on a number of leading farms in Sweden. Oilseed rape can also be established in this way. In trials in England, Carrier drilling produced a higher net return than rape drilling after ploughing.



# Increase profitability with undersown crops

BioDrill makes it possible to drill an extra, small-seeded crop in the same pass as soil cultivation or drilling of the main crop. Practically the only extra outlay is the cost of the seed. The returns include a longer-life ley, increased soil fertility, better soil structure and lower nitrogen costs.



**Mustard before sugarbeet.** An intermediate crop of mustard or fodder beet prior to sugarbeet lowers the risk of nematode attack. With BioDrill on Carrier, mustard can be drilled quickly and easily with good precision during soil tillage.



**Ley.** With BioDrill on Rapid, ley can be drilled at the same time as a cereal crop. With roller drilling, an established ley can be repaired regularly during spring rolling to rejuvenate the sward and prevent patches developing.



**Undersown crops.** With roller drilling, an intermediate crop of e.g. grass or clover can be drilled into a cereal crop in spring. In autumn, an undersown crop of a fast establishing species, e.g. fodder beet or mustard, can be undersown by Carrier drilling directly after harvest. Danish trials have shown that mustard can accumulate up to 20 - 80 kg of nitrogen during the autumn, thus preventing it from leaching out of the soil. Several trials with BioDrill and undersown crops have been set up on leading farms in Sweden and at the Swedish University of Agricultural Sciences.



**Cost-effective oilseed rape establishment.** With BioDrill, oilseed rape can be established at a very low cost. In trials in England, Carrier with BioDrill gave a £ 30/ha better net return than establishment after ploughing.

# Undersown ley trials

## Establishment trial

**Trial site:** Riddersberg research site, Jönköping

**Research leader:** Per-Anders Andersson, Jönköping Agricultural Research Station

**Soil texture:** Moderate loamy sand

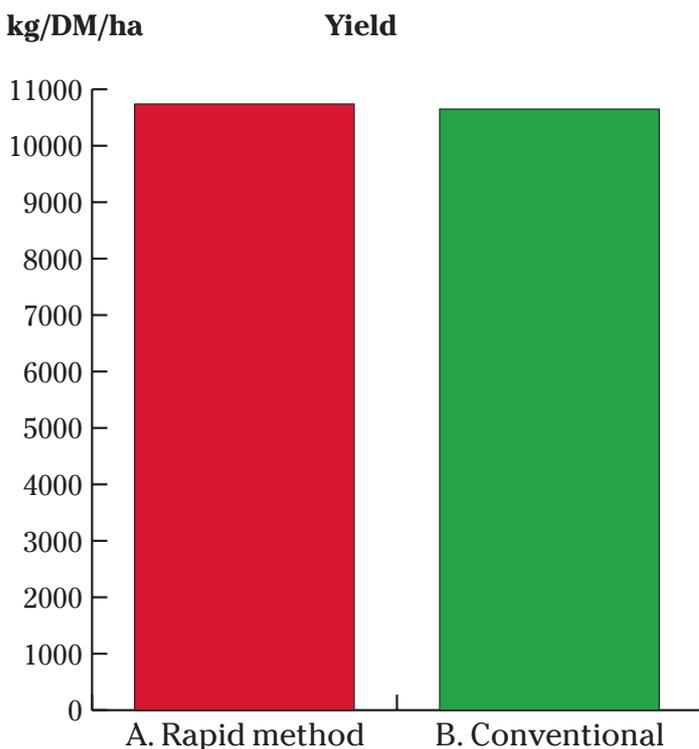
**Seed:** Ley seed mixture: 10% white clover, 20% timothy, 40% meadow fescue, 30% perennial ryegrass

**Time:** The trial, which was divided into 7 trials, took place in the period 2000 - 2002.

In this trial, conventional undersowing in barley, with separate drilling of the ley seed and rolling before and after undersowing, was compared with undersowing using a Väderstad Rapid with a grass box for simultaneous drilling of barley and ley seed. The main difference between the methods was the number of cultivations and passes. Conventional undersowing needed 8 passes, but 3 were enough for drilling with the Rapid seed drill.

### Results of the trial:

Yield was the same with both methods. However, the net return is what matters, as can be seen from the comparison calculations:



## Conclusions

The trial showed that ley yield was the same for both methods of establishment. However, the Rapid method reduced fuel consumption by 15 l/ha and time requirement by 1.2 hr/ha. **The total cost for establishment with Rapid and grass box was 46 £ lower per hectare according to these calculations.**

*The costs assumed in the calculations were: Diesel = 0.55 £/l, labour = 12 £/hour*

## Comparison calculations

These calculations were carried out by Väderstad and are based on standard values obtained from Swedish Machinery Costs.

### A. Ley undersowing using Rapid with grass box/BioDrill

Establishment method	Cost/ha	Fuel	Time
Crosskill roller	13 £	5 l	0,27
Stone collecting	*17 £	2 l	0,40
Rapid Combi 4 m+grass box	40 £	11 l	0,48
<b>Total/ha</b>	<b>70 £</b>	<b>18 l</b>	<b>1,2 h</b>

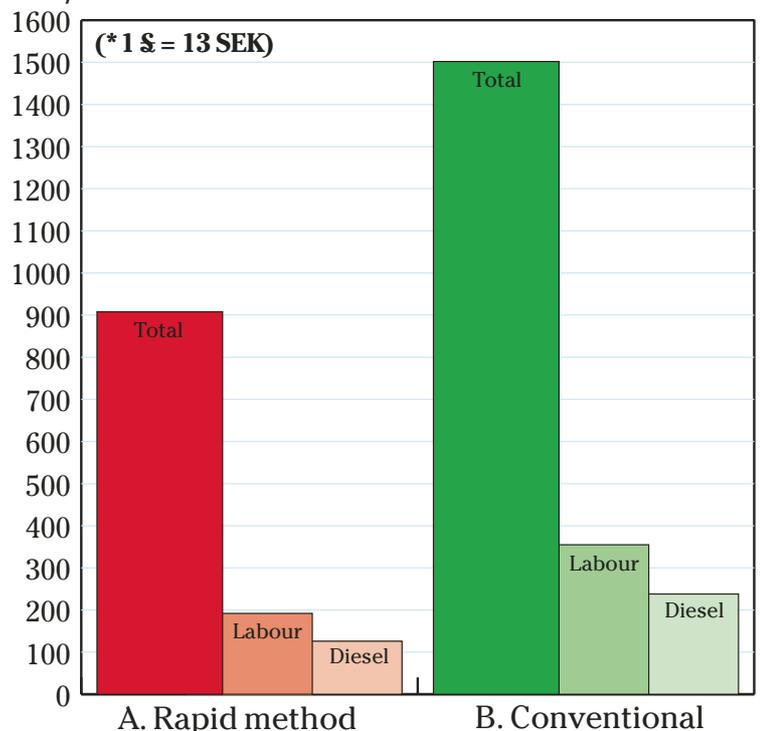
### B. Ley undersowing using conventional method

Establishment method	Cost/ha	Fuel	Time
Crosskill roller	13 £	5 l	0,27
Stone collecting	*26 £	3 l	0,60
Fertiliser spreading	11 £	3 l	0,24
Cultivation	10 £	5 l	0,19
Conv. cereal drilling	19 £	6 l	0,31
Rolling	9 £	3 l	0,15
Separate ley drilling	19 £	6 l	0,31
Rolling	9 £	3 l	0,15
<b>Total/ha</b>	<b>116 £</b>	<b>34 l</b>	<b>2,2 h</b>

\* Stone collection can be halved when Crosskill tillage replaces cultivating, since fewer stones are drawn up. The costs and fuel consumption for stone collecting can vary widely.



## SEK/ha\* Establishment costs



# Ley undersowing trials

## Establishment trial

**Trial site:** Riddersberg research site, Jönköping

**Research leader:** Per-Anders Andersson, Jönköping Agricultural Research Station

**Soil texture:** Moderate loamy sand

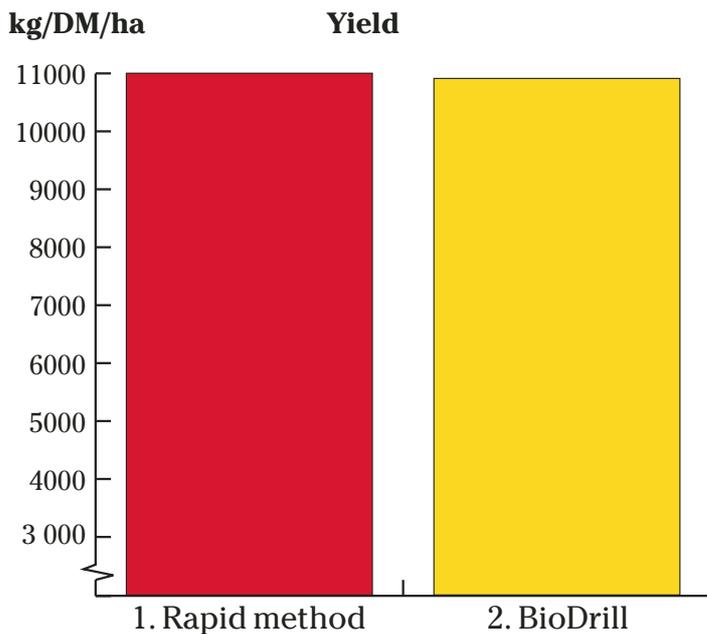
**Seed:** Ley seed mixture: 10% white clover, 20% timothy, 40% meadow fescue, 30% perennial ryegrass

**Time:** The trial, which was divided into 3 trials, took place in the period 2003 - 2004.

In this trial, ley undersowing with Rapid and grass box was compared with a BioDrill on a Crossskill roller. In the BioDrill treatment, cereal was first drilled using a Rapid and the ley was then drilled using BioDrill on a Crossskill roller. In practice, this alternative is the most relevant when the farmer has a conventional seed drill or a Rapid without grass box but wants to undersow ley catch crops and green manure crops.

### Results of the trial:

Yield was the same with both methods. However, the net return is what matters, as can be seen from the comparison calculations:



## Conclusions

The results of the establishment trials showed that yield was the same for undersowing with Rapid+grass box and undersowing with BioDrill on a Crossskill roller. The BioDrill/Crossskill-alternative appears to be more interesting for a conventional ley establishment system where the ley is undersown during rolling after cereal drilling. BioDrill drilling provides increased flexibility in all production options.

*The costs assumed in the calculations were:  
Diesel = 0.55 \$/l, labour = 12 \$/hour.*

## Comparison calculations

These calculations were carried out by Väderstad and are based on standard values obtained from Swedish Machinery Costs, (HS 2004).

### 1. Ley undersowing using Rapid with grass box

Establishment method	Cost/ha	Fuel	Time
Crosskill roller	13 \$	5 l	0,27
Stone collecting	17 \$	2 l	0,40
Rapid Combi 4 m+grass box	40 \$	11 l	0,48
<b>Total/ha</b>	<b>70 \$</b>	<b>18 l</b>	<b>1,2 h</b>

### 2. Ley undersowing using BioDrill on a Crossskill roller

Establishment method	Cost/ha	Fuel	Time
Crosskill roller	13 \$	5 l	0,27
Stone collecting	17 \$	2 l	0,40
Rapid 4m, barley drilling	40 \$	11 l	0,48
Crosskill +BioDrill, ley drilling	15 \$	5 l	0,27
<b>Total/ha</b>	<b>85 \$</b>	<b>23 l</b>	<b>1,4 h</b>

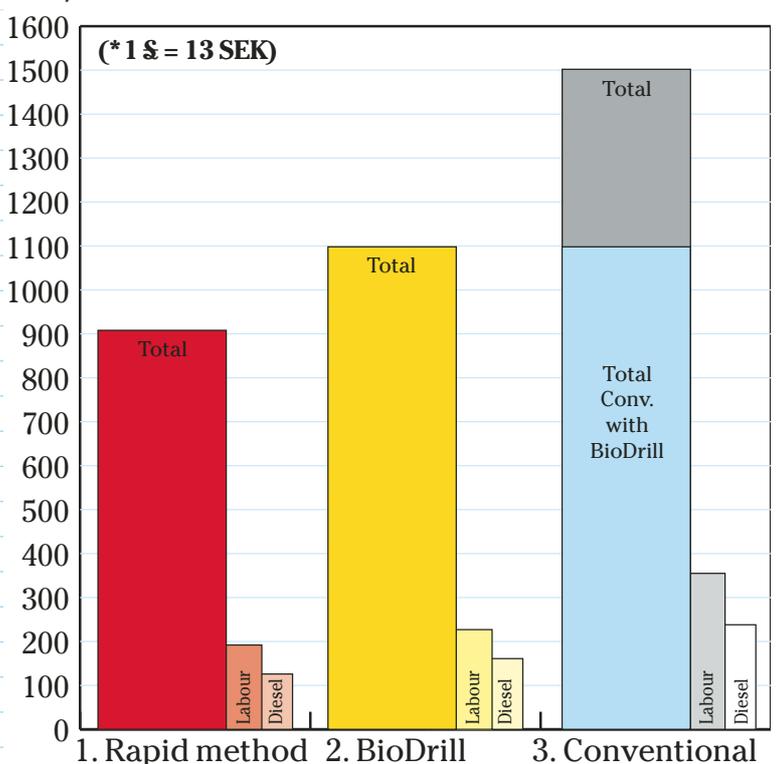
### 3. Ley undersowing using conventional method\*

Establishment method	Cost/ha	Fuel	Time
Crosskill roller	13 \$	5 l	0,27
Stone collecting	*26 \$	3 l	0,60
Fertiliser spreading	11 \$	3 l	0,24
Cultivating	10 \$	5 l	0,19
Conv. cereal drilling	19 \$	6 l	0,31
Rolling	9 \$	3 l	0,15
Separate ley drilling	19 \$	6 l	0,31
Rolling	9 \$	3 l	0,15
<b>Total/ha</b>	<b>116 \$</b>	<b>34 l</b>	<b>2,2 h</b>

□ = If the last three passes are replaced by a pass with Crosskill roller+BioDrill, this saves 23 \$/ha and the total cost of establishment becomes 93 \$/ha.

*\*This treatment was not included in the establishment trial but was considered in the economic calculations. The figures are taken from treatment B on the previous page.*

### SEK/ha\* Establishment costs



# BioDrill on RDAS/RDAC



The seed drill operator inspecting drilling behind a 6 m Rapid Combi equipped with BioDrill.

BioDrill on Rapid allows the farmer to accurately drill ley seed or a catch crop in the same operation as drilling of the main cereal crop.

## Seed growing at Svenstorp

The Svenstorp/Björnstorp farm in Skåne is one of the users of BioDrill on RDAC. The drill is used for establishing seed crops of red fescue and ryegrass. Drilling works well and establishment is very good. According to farm manager Per Skovstedt, BioDrill has very precise seed metering and emergence is very uniform.

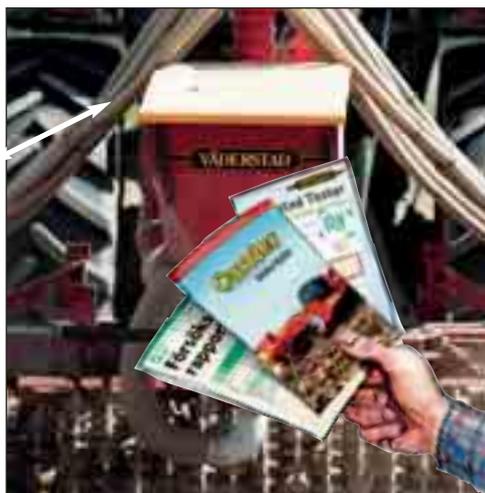


**BioDrill mounted on RDAS.** The large 360 litre hopper harmonises well with the grain hopper on the seed drill. The seed hoses are situated just in front of the Rapid wheels, which cover the seed along with the following harrow.

# Specification:

- Hopper volume 360 litres
- Fenix seed feed unit
- On Rapid: Hydraulic drive of the seed feed system is taken from the main drilling system
- On Carrier/Rexius/Rollex: Mechanical drive of the seed feed unit is taken from the rollers

- Hydraulic fan: Requires 1 x double acting service and 1 x free return (to tank). On Rapid, the air is diverted from the seed drill fan.
- Weight approx. 200 kg
- Max. load 200 kg
- Control-Switch for starting and stopping drilling.
- Control Station-Bio for full control of small seed drilling.



**Order our special booklet 'Keep your soil growing' and read more about undersowing, catch crops, ley drilling, rapeseed establishment, wildlife crops, etc.**

Manufacturer:

**VÄDERSTAD Ltd.**

Unit One, Ellesmere Business Park  
 Grantham, Lincolnshire NG31 7XT  
 Tel. 01476 581 900 • Fax 01476 581 901  
[www.vaderstad.com](http://www.vaderstad.com)

Dealer: