

## TWIN FORCE trial 2017 and 2018

We received now an independent test report from the Aarhus University. There is a presentation available, which should be used to show the advantages of TWIN FORCE active air assistants. Further information are available from Christoph Schulze Stentrop [css@hardi-international.com](mailto:css@hardi-international.com).

### TWIN trial Flakkebjerg



- Trials done Aarhus University – Flakkebjerg Research Center – Peter Kryger Jensen
- Sprayer: HARDI COMMANDER 4500 I – 24 m TWIN FORCE
- Trial done on stubble and short grass
- Nozzle ISO LD 025 – Spray pressure 3 bar
- Working speed - volume rate
  - 8 km/h Conv & TWIN - 150 l/ha
  - 12 km/h Conv & TWIN – 100 l/ha
  - 16 km/h TWIN – 75 l/ha
- Measurement of deposit under the boom
- Sedimentation drift following the German JKI protocol
- Low/normal wind speed 3 – 4 m/s and higher wind speed 6 – 8 m/s



### Good to know

- Bare ground and stubble are the most challenging spray conditions for medium spray quality
- Petri dishes (area 149.6 cm<sup>2</sup>) had been used as collectors, standing on a small platform – only sediments are measured and droplet size has no influence
- There are 5 rows of petri dishes in 3, 5, 10, 15 and 20 m and on 4 positions under the boom – every run has 45 petri dishes.
- Every setting has been tested in 3 repetitions – which gives 15 runs per test day
- Main focus was to collect data also in difficult conditions as higher wind speed above 6 m/s and with higher driving speeds up to 16 km/h



# Good to know in regards to drift reduction

- The ISO-LD 025 has at 3 bar medium spray quality and is in droplet size comparable with the ISO-F 04 which is the German reference nozzle for drift trials
- Comparing the data with the German JKI basic drift curve shows that the conditions was challenging – the conv. 8 km/h was approx 75 % higher than the basic drift curve
- The drift level is very low also in conv. spraying – it is the enviromental aspect important not the PPP saving
- TWIN FORCE has in France and Netherland always a higher drift reduction class – the discussion with JKI is not finished – but also this data shows TWIN is always a class better



## SUMMARY

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- Spray deposition and spray drift from applications at two wind speeds were tested at 8 and 12 km/h with conventional technique and 8, 12 and 16 km/h with TWIN air-assistance.
- Deposit values under the boom were generally larger at the lee side compared to the wind side. Deposit values were more even at both 8 and 12 km/h when TWIN air-assistance was applied.
- The spray drift measurements in the test overall showed a significant influence of spray technique.
- Conventional technique at 8 km/h and 12 km/h gave the highest spray drift values.
- Spray drift with TWIN air-assistance at 16 km/h was significantly reduced compared to the two conventional applications.
- TWIN air-assistance at 12 km/h and 8 km/h further reduced drift significantly.



# Conclusion

- Spray deposition and spray drift from applications at two wind speeds were tested at 8 and 12 km/h with conventional technique and at 8, 12 and 16 km/h with Twin air-assistance.
- A 24 meter trailed HARDI TWIN sprayer equipped with LD-025 nozzles at 3 bar pressure was used in the test.
- Deposits values under the boom were generally larger at the lee side compared to the wind side. The differences was most pronounced in the test at high wind speed where the differences in deposition between wind side and leeside was especially large with the two conventional techniques.
- The most even distribution was found with TWIN air-assistance at 8 & 12 km/h. The spray drift measurements in the test showed a significantly lower drift from TWIN at 8 km/h compared to the other four techniques at both wind speeds. Conventional technique at 8 km/h and 12 km/h gave the highest spray drift. The two TWIN applications at 12 and 16 km/h obtained significantly lower spray drift than the two conventional applications, but higher drift values than TWIN at 8 km/h.



## HARDI conclusion

Important: What have we seen so far spraying under difficult conditions with same driving speed, nozzle, pressure and spray quality are:

### **Deposit under the boom**

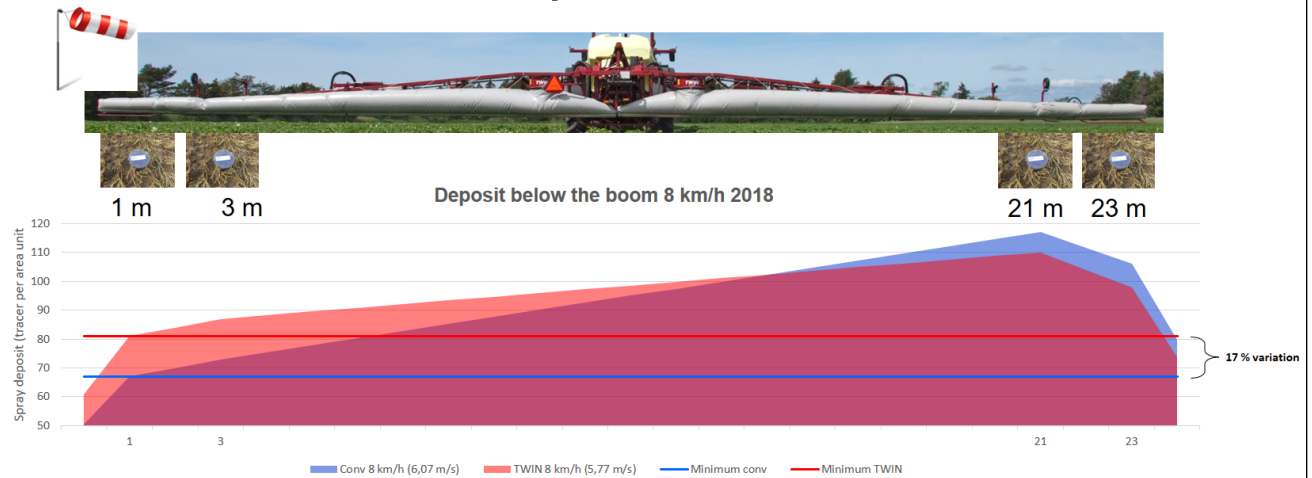
- In test results from Flakkebjerg/Århus University, the deposit with TWIN boom is more even than the conv. boom
- The variation in the minimum deposit under the boom between conv. and TWIN was up to 30 % which indicates a possible PPP reduction of 30 % in an open crop/bare soil
- In a dense crop this figure will be higher

### **Drift reduction (besides the boom)**

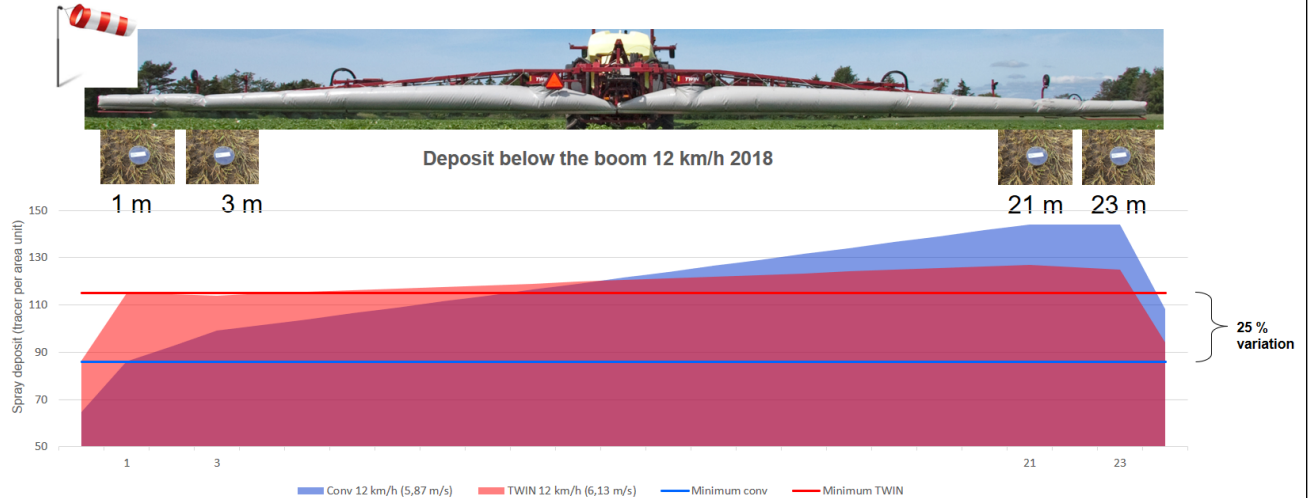
- TWIN reduces sedimentation drift up to 80 % vs. conventional with same nozzles, driving speed and wind speed
- In higher wind speed and with higher driving speed TWIN does a far better application



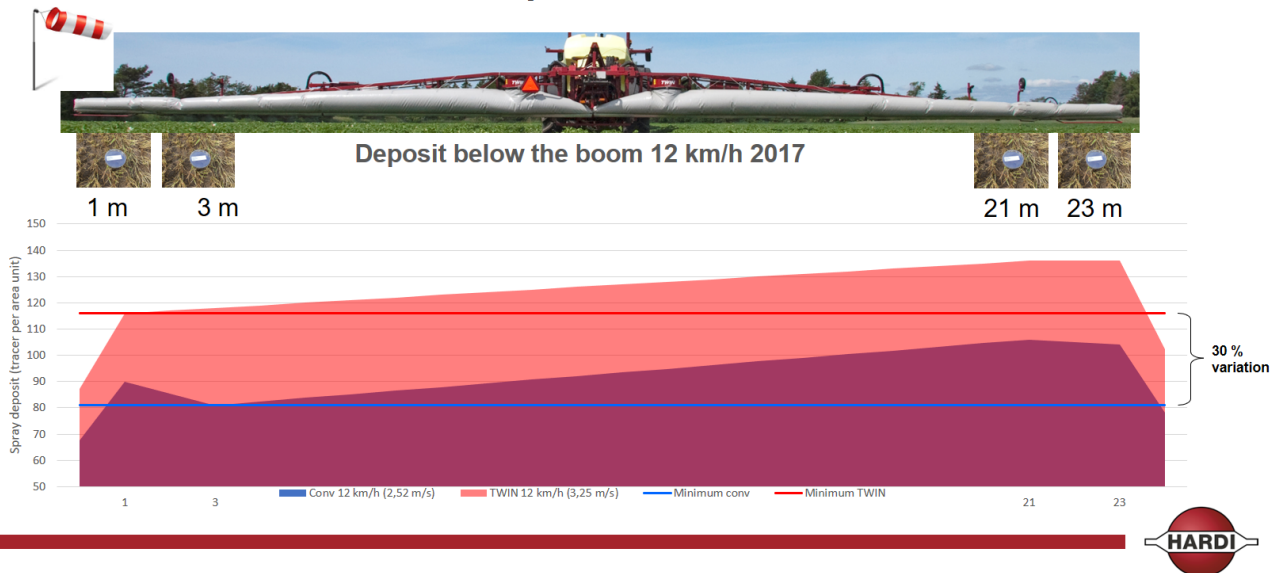
# TWIN FORCE deposit trials



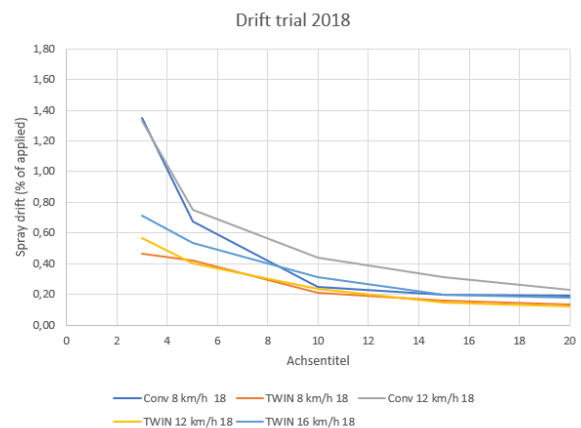
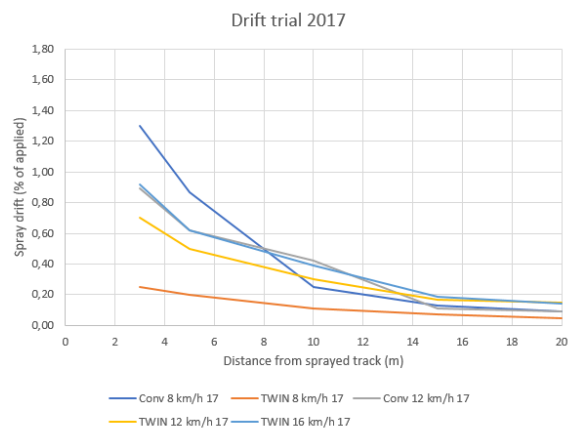
# TWIN FORCE deposit trials



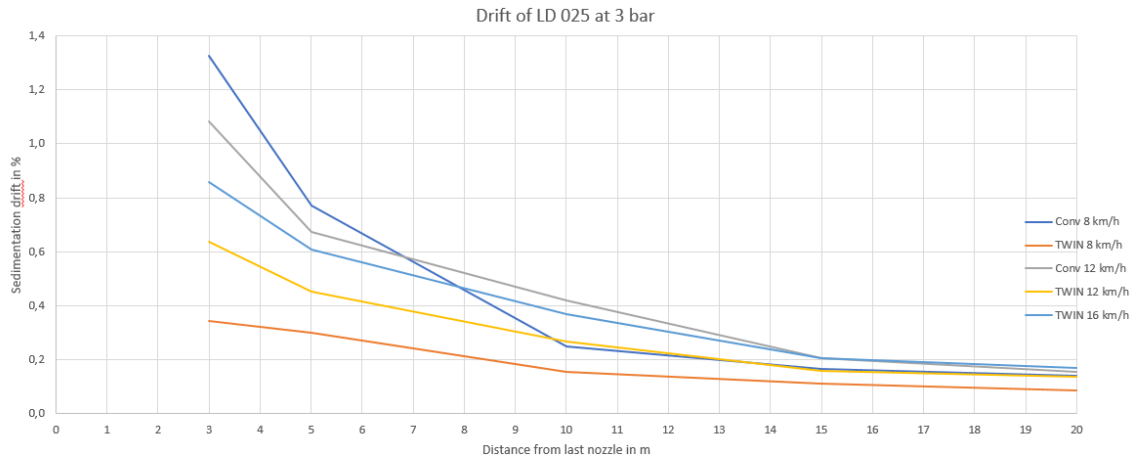
# TWIN FORCE deposit trials



## Drift trial 2017 and 2018



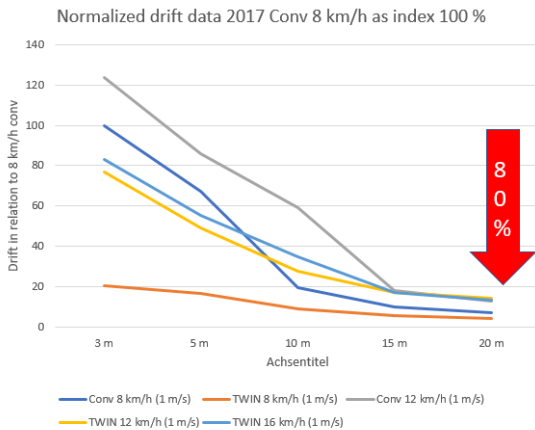
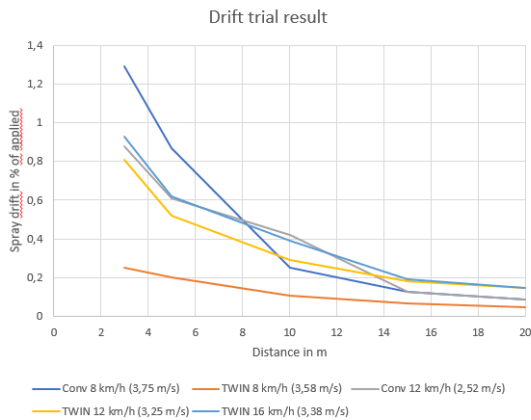
# Drift curve – average 2017 and 2018



## TWIN gives 80% reduction of drift

– with same nozzles, driving speed and wind speed

Normalizing for wind speed differences - Drift / (wind speed (m/s) – 1 m/s) – following Paul Miller (Silsoe research)  
As trials are done at different wind speed – the data could be normalized using that formula



# Drift results average 2017 & 2018

