

Exploring opportunities for bio-oil within the New Zealand Forestry Industry

Millan Visser – Final year Bachelor of Forestry Science Student, School of Forestry

Background

- Bio-oil products are nice on the environment, the people and the machines that use them
 - Even the possums love it!
- For example, in New Zealand it is estimated that in excess of 2 million and as much as 2.5 million litres of chain bar oil is discharged into the environment each year
- Forestry contractors are sceptical about making the switch to bio-oils especially if it may put their machinery at risk
- The bio-oil used in this trial is made from rapeseed, which is pressed to extract the oil
- PF Olsen have taken the initiative to trial this oil through a range of their contracting crews



Research Questions

- Are bio chain bar oils cost effective compared to standard mineral oils?
 - What is the price difference?
 - How can they be made to be competitive?
- How much can you reduce the chainsaws oil use, both for standard mineral and bio-oils?
 - At what point does temperature, and therefore wear, become an issue?
- What other benefits are seen from a shift to bio-oil?
 - Does contractor health improve?

Methodology

There were two separate parts to the trial:

Chainsaw Bar Testing

- Measuring bar temperature on the two different oils while reducing the oil flow
- Testing done using both mineral and bio-oil

Operational Trial

- Have 10 contractors from around the country trialling bio-lubricants for one month
- Sent out two surveys
 - Pre-trial - for oil usage and thoughts on bio-oil
 - Post trial - for oil usage over the trial period, if they were going to continue using bio-oil (why / why not), and questions about crew health

Comments from Contractors

"... wound back usage but noticed increase wear, had to increase flow to ¾ of mineral oil to get the same result"

"...the possums love the stuff"

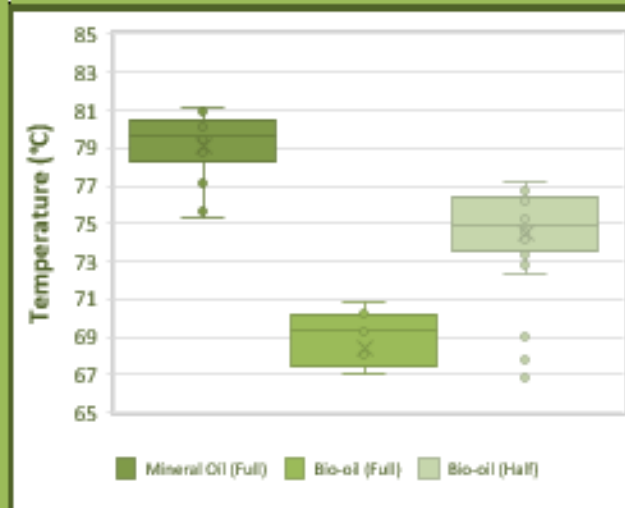
"Cold weather brought up a clogging problem which needs further investigation"

"Considerably less build up on side covers"

"Chains do not stretch as much"

"Wouldn't look back to mineral oil now"

Preliminary Results



As these results show, bio-oil (even at a lower flow rate), clearly operates at cooler temperatures compared to normal mineral oil

Operational Trial



2/3 of the contractors that completed the trial say they will continue to use the bio-oil

Oil Type	Temperature (°C)				Temperature difference to mineral oil
	Maximum	Minimum	Average	Std Dev	
Mineral	81.1	75.3	79.13	1.84	
Bio (full)	70.9	61.0	68.40	3.02	14%
Bio (half)	77.2	66.9	74.45	2.58	6%