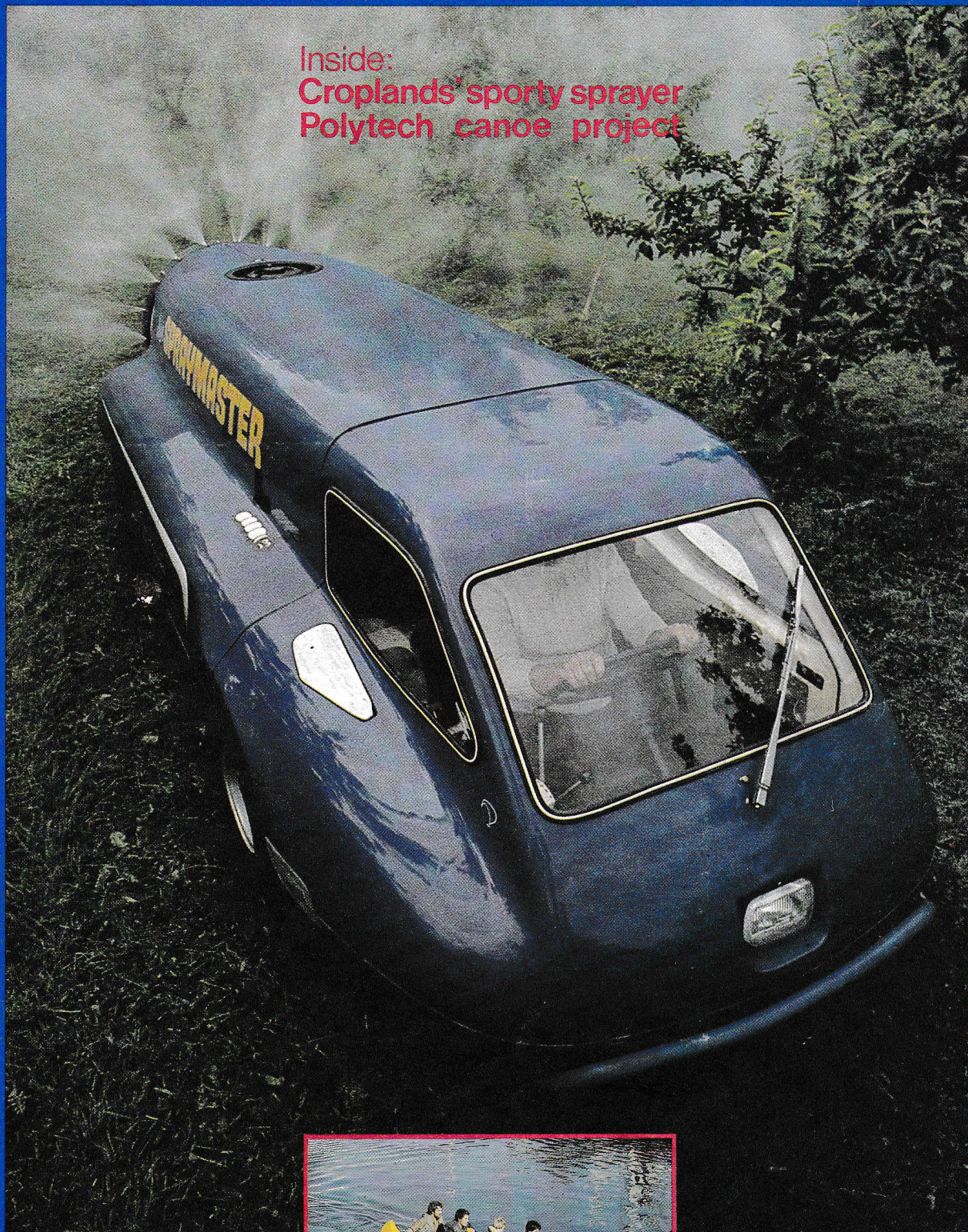


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Croplands' sporty sprayer
Polytech canoe project



SPORTY SPRAYER



It's a far cry from the usual image that comes to mind when talking about orchard sprayers. Lean and low-slung, both in looks and colour it strikes the observer as something that might have mutated from the pits at Le Mans or Indianapolis or perhaps from the workshop at NASA.

But Croplands' Spraymaster hasn't been designed for beauty contests. By all accounts so far it does an efficient job in the orchard with a degree of comfort and safety previously unknown in the industry.



The Spraymaster was in fact spawned on the Rotorua property of orchardist Bob Gee. Considering for some years the idea of a self-contained machine that would allow safe and comfortable spraying of a fairly large area in as short a time as possible, Gee approached engineer Ross Baker with a view to seeing just what could be developed. The combination of an orchardist knowing what the machine would need to do and being able incidentally to make a substantial design contribution in his own right, and an engineer with automotive design experience, proved a fruitful one. Utilising spraying components from the orchard's existing Platz trailer type sprayer, the all-enclosed unit went into use on the 56 acre property in the 1978 season and proved itself by reducing overall spraying time by around 40 percent.

The Fruitgrowers Federation saw this and picked up on the need Spraymaster appeared to fulfill. A meeting in Rotorua of Gee and Baker with key Federation field staff and Wellington spraying equipment specialists Croplands Equipment Ltd led to redesign of the unit to enable it to be most efficiently tooled up for commercial production and to increase its potential application. It was felt that the original was too bulky, and that it should be rebuilt with more streamlining and with only one engine, while tank construction also came under close scrutiny.

Spraymaster in action: the initial version developed by Gee and Baker that went into service on Gee's orchard in the 1978 season reduced overall spraying time by around 40 percent.

Final design

The outcome of these efforts saw the Spraymaster Mk 1, with the Gee/Baker partnership now operating under the name Heron Developments Ltd and with their order book open.

The 5.3 metre long, 1.4 metre high machine is in three sections of cab, tank, fan and sprayer.

Up front most orchardists would agree that sitting back into the adjustable high-back seat after the comfortable

sounding 'chonk' of the door gives a rather more amenable view of the world that 'kitting up' with all the required apparel and climbing up onto the tractor.

The cab is air conditioned with filtering provided by a large-capacity agricultural filter designed for use in tractor cabs and the like. Remote control of all the spray mechanisms and gauges ensures total safety in the event of a burst pipe or hose, as no spray liquid enters the cab. Dash instrumentation includes a digital read-out for fan and pump revs as well as land speed. The more standard gauges

showing engine temperature, and oil pressure and fuel are present, as is an hour clock.

An optional touch of luxury is provided by the radio/stereo cassette player—the total effect giving the impression that the whole cab environment has been built 'all mod cons' to suit the driver—obviously the idea of someone who knows just what long, and possibly cold and wet, periods behind the tractor wheel can mean in terms of tedium and discomfort.

Behind the cab the Annovi/Reverbi high pressure diaphragm pump of 140 lpm (or the optional 190 lpm) allows dilute or low volume spraying. Both pumps have sufficient capacity to provide maximum agitation through two specially designed venturi jets. By using the venturi drive, gearing and leaking gland problems were eliminated while proper agitation was assured at all speeds.

The large, 3000 litre tank inevitably reduces filling and travelling time, while the design of the tank lid also allows direct coupling to a 76mm line from either water supply or nurse tank. The large capacity stainless steel suction filter and heavy duty brass pressure line filter ensure that there are no nozzle blockages.

At the rear, business, end a meaty 140 hp Ford engine—the same used to power the Falcon car—delivers power for the whole sprayer; fan, pump, and wheel drive. A high capacity flow-through radiator ensures that temperature control is maintained, a particularly important requirement in hot summer conditions.

A 90 litre petrol tank gives a long term operation, and the unit apparently only uses less than seven litres an hour. (The thinking behind the choice of petrol as opposed to diesel drive was that the former would prove more economical and give a smoother drive. Diesel fuel is, in addition, limited in supply in New Zealand while there is on the other hand the possibility of using LPG.)

The automatic transmission is also Ford-supplied, with a high and low ratio that provides a total option of six gears. The low ratio spraying speed is set at 2.4-5.6 kmph (a variation designed to suit each property) but faster speeds can be obtained with a relatively simple adjustment that still allows the variation. The high ratio for road travel allows a speed of up to 30 kmph.

Probably Spraymaster's chief innovation however is the patented four-wheel drive and power steering system. The 8-ply Terragrip tyres deliver maximum traction in the most adverse of ground conditions. The design of the tank assists this by optimizing the distribution of the load over the wheels.

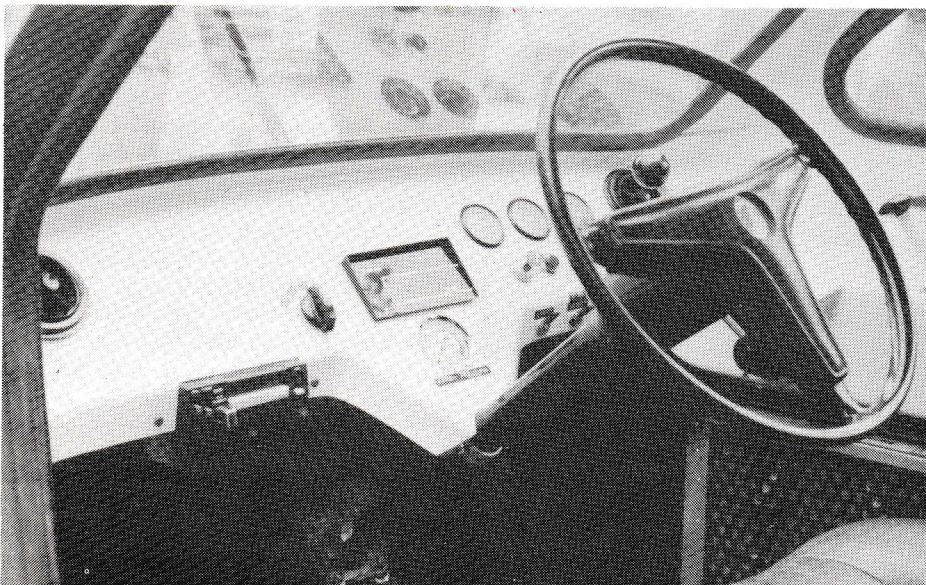
The four-wheel steering goes a long way towards overcoming the old problem of four-wheel drive vehicles needing a comparatively large turning circle. In this instance the rear wheels take exactly the same track as the front wheels. No corner cutting as tends to happen with conventional trailer type equipment, and the turning circle a snip at 7.3 metres. What it



Spraymaster number one: The traditional problem of four-wheel drive vehicles requiring large turning circles has been eliminated with four-wheel steering. The 7.3 (24ft) turning circle from the outside of the tracks enables the sprayer to turn from one row into the next in one movement. The rear wheels track identically behind the front ones so there is no corner-

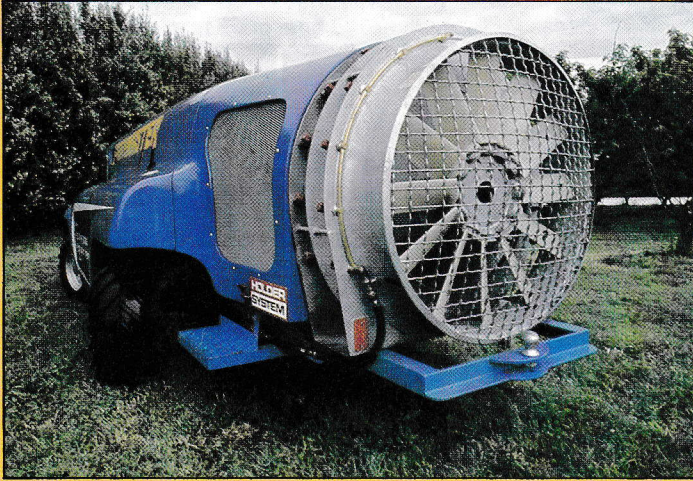
cutting as generally occurs with towed equipment.

This photo also shows the original contours of the machine. The production version was 'fined down' and streamlined to create an unbroken line from the top of the cab right through to the fan unit at rear.



In the driver's seat: note the stereo cassette player and digital readout. Total integrity of the cab is ensured as all spray controls and gauges

are operated remotely with no spray lines entering the cab.



The Holder TU71 fan has infinite rev options from 1800 to 2600 rpm, giving total control over air output and speed.

Incorporation of the Holder fan systems is a further example of the use of proven equipment from major manufacturers that should allow ready servicing or even replacement in most countries around the world. The Ford engine is in widespread use throughout Australasia, but other engines could be used to drive the machine. Axles and differentials are Landrover; Annovi/Reverbi diaphragm pumps are also in common use through the agricultural industries.

Front view displaying the well-sculpted contours of the cab. Note the headlight and full sweep windscreen wiper and washer. A further feature is the retractable rear view mirrors that recess into the panelling when not required, preserving the overall 'swept back' purity of line.

The unique profile was designed to minimize fruit and tree or vine damage while still allowing passage through the orchard. Dimensions compare favourably with the diesel powered sprayer developed in Australia: Height 1.4 metres (1.75m), Length 5.3 metres (4.75m). The extra length of the Spraymaster gives a further 1000 litres tank capacity and therefore reduced time spent in filling.

means in terms of efficiency and manoeuvrability is that the vehicle can turn from one row of trees into the next in just one movement, even in the more intensive plantings or vine rows.

At the very end of the machine the Holder TU71 fan unit (with the option of the larger TU80) has a 1800-2600 rpm range, which allows for total control over air output and speed to suit various conditions and crop requirements. Twelve swing-over/shut off nozzles using Spraying Systems discs and whirlplates provide the proper calibration at either high or low volume without spray wastage.

All in all a pretty well thought out piece of design, and one that takes account of its possible application in a number of situations within New Zealand and in other countries. The pump and fan fittings as well as axles and differentials are supplied by major manufacturers and maintenance is thus made quick and cheap in most countries. All drives are mechanical, using parts and fittings available from most automotive suppliers, and have been sited so as to give maximum accessibility. The diaphragm pump can be reached from the cab for pressure adjustment and servicing, while the panels over the motor at the rear both lift up normally for maintenance requirements.

Marketing

After the final design was completed and the second machine built, orders started to come in following the wide interest in

the machine that had been aroused throughout the country. Three orders were received from Hastings growers in December 1980: when delivered in June this year they were the first models to be commercially supplied.

By this stage however it was becoming apparent that manufacture to contract could become a sizable undertaking. Preferring to stay with their actual construction involvement, Bob Gee and Ross Baker sold their design to Croplands Equipment, and the Wellington-based firm which had till then been assisting with the gearing-up for production took over the complete operation in June. Baker and a small staff now construct the Spraymasters at what has been established as Croplands' Rotorua plant.

Croplands General Manager, Miles Deck, who has a long experience with spraying equipment—developing and marketing the successful Cropliner towed sprayers—now sees a very promising future for Spraymaster, particularly in the larger orchard market in New Zealand and in export.

'Spraymaster represents really a step up to cater for the big, say 40 acres and upwards operator. The one who is likely to be most conscious of spending a lot of time sitting amidst chemicals and noise, of having to wear all his protective clothing.

'So this machine offers him a big performance, but in comfort and safety.'

Deck sees the unit as having application throughout the world, particularly in the US and Australia. One machine went to Adelaide last month and at least a dozen are wanted in Australia already. Croplands are working through a sprayer distributor there who confirms the pro-

mise of that country's market. (There is in fact a diesel-powered Australian sprayer available there but in streamlining and traction and turning efficiency Deck rates the Spraymaster as superior.)

The company is presently aiming at building 20 to 24 machines a year, with orders already six months ahead. At home the marketing of Spraymaster is being handled by the Fruitgrowers Federation, which has been supportive of the project through all its stages.

It's an arrangement, says Deck, that suits both parties. Previously an importer of machines and thus competing against Croplands which was then expanding its production of Cropliners, the Federation approached the company some years ago with its proposal to market its sprayers. ('In principle it was a case of two rivals joining forces', Deck notes. 'We had experience in manufacture and they have resources in the marketing field with all their branches and knowledge of the industry'.)

Following the Hastings contracts, orders for six more machines were received from within New Zealand. And the asking price? The Spraymaster sells for a neat \$36 000—a price which is competitive, particularly when rated beside its overseas equivalents. It becomes even more attractive as a co-operative buying venture.

One thing does seem certain. Humming along in the air conditioned cab of the Spraymaster, stereo on, there are a number of orchardists that will be finding one of their hitherto most tedious, time-consuming and unpleasant jobs not only cleaner, more comfortable and efficient, but downright enjoyable to boot! ☑