

# HOW TO ECONOMISE ON BLISTER-BLIGHT CONTROL

## THE USE OF MIST BLOWERS IN CONJUNCTION WITH SUNSHINE RECORDERS

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In December's issue of the *Tea Quarterly* (Elias 1960), I gave some details on the use of mist blowers. Since then, work has been done to find out more about the cost of spraying per acre, the performance of these machines and the distribution of the spray on the foliage.

Dr Mulder, who has preceded me, has already pointed out the value of using mist blowers in conjunction with sunshine recorders. By timing the spraying rounds according to sunshine records, we can often economise on the number of sprayings required; by using mist blowers, we can not only achieve the more rapid coverage of large areas which is desired but can appreciably reduce the cost of labour per acre.

During the past few years, tens of thousands of shoulder-mounted motorised mist blowers of various makes have been sold all over the world. However, these machines are comparatively new in the field of spraying and dusting in Ceylon. The cost of one of these machines varies from Rs. 750/- to Rs. 950/- and the weight from 28 lb. empty to 56 lb. fully loaded. The sprayers are simple in design and easy to operate. The machine (Plate 1) consists essentially of a small two-stroke motor, driving a fan which produces a strong air-blast down the 'lance'. The spray liquid is fed from the liquid tank on top to a nozzle or jet in the end of the air lance. As with a paint-spray gun, the air blast breaks up the spray liquid into very fine droplets and also assists in carrying these to the 'target'. This is the principle of 'air-assisted' spraying. The droplet size is finer than that produced by ordinary knapsack sprayers and hence it is possible to obtain a good distribution of the spray on the foliage with much smaller volumes of spray liquid per acre.

Large-scale spraying against Blister Blight was carried out at St Coombs using several makes of mist blowers which were available on the market and were kindly lent to us by Colombo firms.

A mixture of 4 ozs of copper fungicide in two gallons of water per acre was found to be adequate and effective for protection against Blister Blight under adverse weather conditions, except for young tea and for tea recovering from pruning, where 6 ozs of copper fungicide per two gallons of water per acre was necessary.

For the same amount of copper fungicide per acre, protection was found to be at least as good in fields sprayed by mist blowers as in fields sprayed by conventional knapsack sprayers. Observations showed that there was extremely good distribution and that the fine droplets of spray from these machines were evenly spread over the flush and the upper surfaces of the mature leaves (Plate 2) for 3-5 rows on either side of the spraying labourer, i.e. 6 to 10 rows of tea at a single spraying, under favourable wind conditions. When winds were particularly strong there was some reduction of this area. The liquid is atomized and ejected with the aid of a strong

air current which reaches a velocity of over 200 miles per hour at the nozzle. The machines are used always at full throttle. Any lessening of engine revolutions below the maximum (which is governed) results in less air blast, resulting in less break-up of the spray liquid and less 'carry'.

A team of three labourers operating two mist blowers can spray 40 acres in a day with ease. Treatment is thus more rapid with consequent considerable saving in labour costs. To achieve this, however attention must be given to rapid refilling of the sprayers. Previously, I gave the figures of 10½ acres per day per machine (Elias, 1960); this was arrived at in the early stages of testing these machines, and in subsequent work, with better field organization, and slight modification of the machines (see below), much better results were achieved.

Naturally, the speed of operation will vary from estate to estate, due to terrain, height of the tea and other factors. The suggestions that follow may be helpful.

The aim is to apply the required dose of fungicide in about two gallons of water per acre. To achieve uniform spraying, the machine must give a suitable constant spray output, and the labourer must walk at a suitable constant speed, a speed at which he will cover the acre whilst spraying the two gallons. The time he takes to cover an acre will depend on his speed of walking, the number of rows he takes at a time, and the spacing between the rows. The labourer should have an easy pace so that he is able to maintain the same speed on the steepest ground as on easy terrain; he should be trained to do this. As an example from St Coombs, a labourer walking at a speed of about 30 yards per minute (which is nearly 1 mile per hour) and going down every tenth row (that is, spraying five rows on each side) will walk an acre in 10-12 minutes. Thus we need to arrange the output of our machine so that we spray two gallons of liquid, containing the 4-6 ozs of copper fungicide, in 10-12 minutes. Obviously, if the liquid output varies we cannot hope to achieve regular spraying. Many of these machines have variable dosage taps combined with the on-and-off tap on the lance; these are troublesome because, firstly, the labourer can alter it while spraying, and, secondly, we have found that they do not in fact give a constant output for the same setting. To our own machines we were able to fix a dosage restrictor jet in the liquid feed pipe; these are supplied in different sizes for some makes but could easily be made for any make. (Plate 3).

It is worth while if you start this spraying technique and have to train labour, to check the time of machine output regularly, and also the speed of walking. A stop watch is useful.

The actual working period per day was reduced to five hours. One labourer in the team mixed the fungicide, carried supplies of fuel and oil, and a tool kit to enable him to carry out minor running repairs. Contrary to expectations, labour reaction was favourable and there were no complaints about noise, vibration or excessive weight. Given an extra inducement, a pair of ear plugs and protective clothing, the labourer considered himself a specialist from the outset.

Spraying can be done for under Re. 1/- per acre. This includes the cost of labour for spraying with an extra rate of -/40 cts per day, cost of the fungicide at 4 ozs per acre, and the cost of petrol, oil, tea and protective clothing.

Serious consideration should be given to the use of mist blowers in the future in conjunction with sunshine recorders. Each machine is capable of spraying 120 acres in a 6-day week. Therefore large areas can be sprayed at any given time as soon as the hours of sunshine diminish.

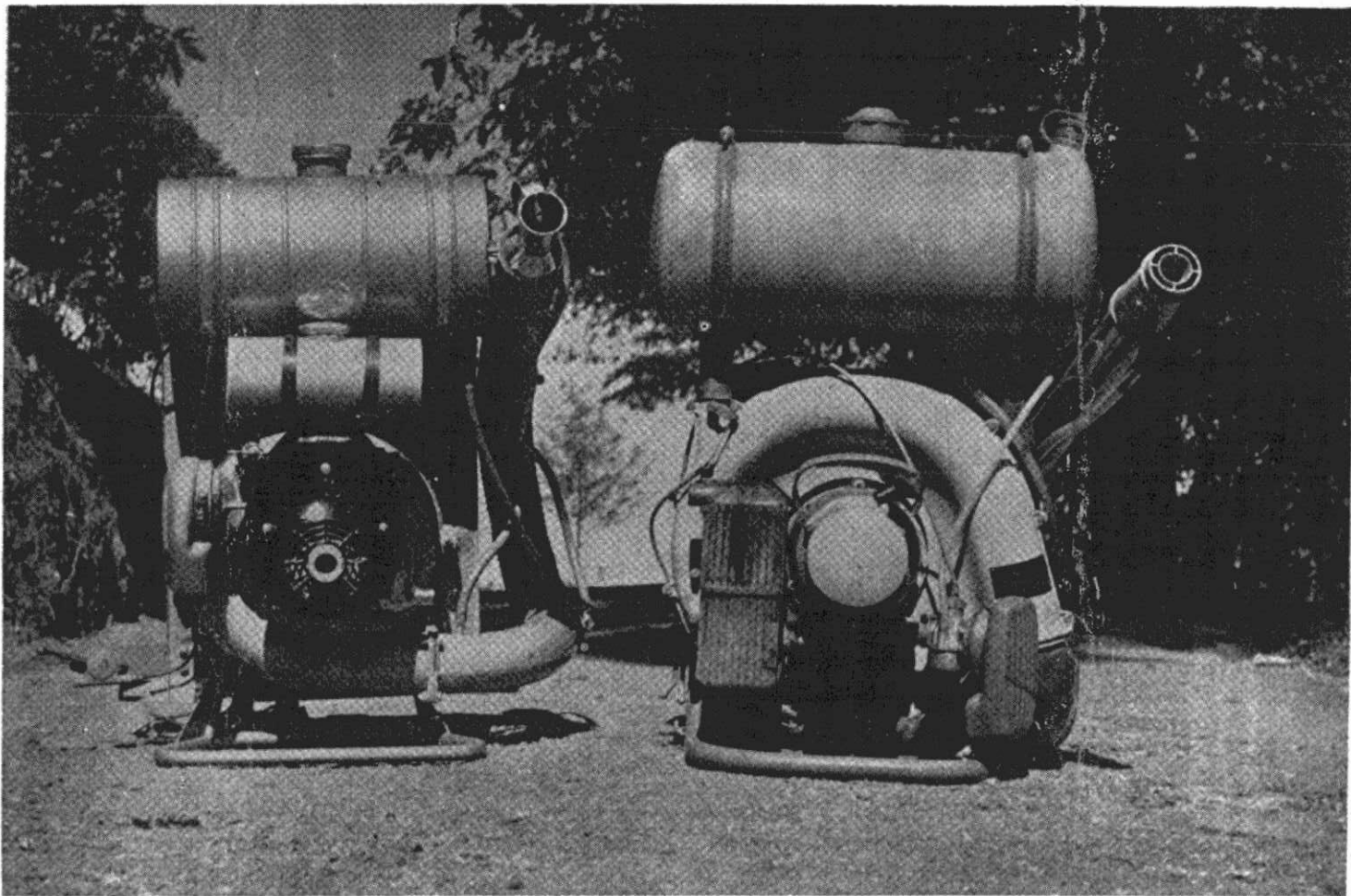


Plate 1. Two makes of motorised mistblowers, rear view.

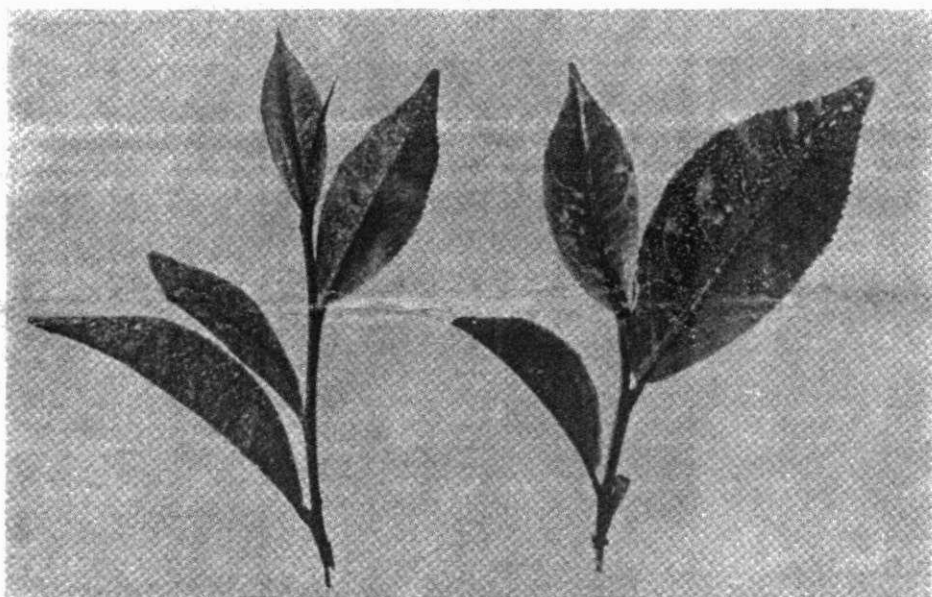


Plate 2. Typical distribution of spray deposit from mistblower (left) and Knapsack sprayer (right). Note the larger droplets on the right shoot. The photograph is of a fluorescent dye at 4 oz. per acre, taken in u.v light.

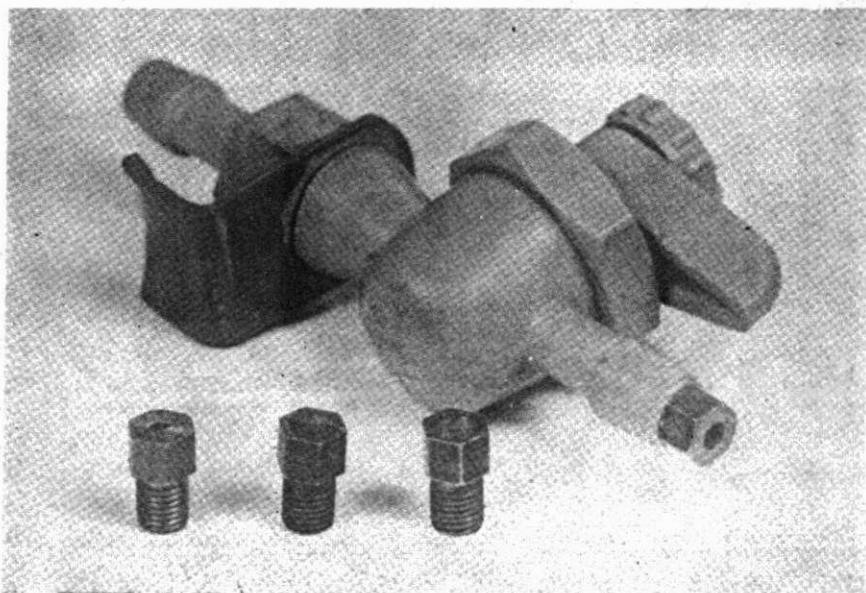


Plate 3. Dosage restrictor jets of different sizes, showing how they fit in the on-and-off tap of a mistblower.

Finally, I would also mention colloidal copper formulations which, because of the extreme fineness of the particle size and good suspension properties, are very suitable for use in mist blowers. The formulation tried out at St Coombs contains 27% actual copper, as compared with the usual 50% wettable powders, and is used at the same 4-6 oz. per acre; copper residues in the made tea are therefore less and can more easily be kept below the tolerance level of 150 ppm.

### Reference

ELIAS, A. L. (1960). Motorised knapsack mist blowers. *Tea Quart.* 31: 169-171.

**Question**—Mr K. D. Seelanatha, Matale West Estate.

The spores of *Exobasidium vexans* (Blister Blight) are known to be carried and brought in by mist and cloud during certain monsoons in different areas. Is it not possible to control Blister Blight on a district scale by means of aerial spraying of the incoming clouds en route? Is not this method likely to be more economical, and the advantages widespread? If this approach has not been investigated is there a likelihood of it being done in the near future?

*Dr Mulder*: When the Blister Blight fungus first came to Ceylon it most probably came in the way described by the questioner, namely over a long distance through the air in the form of spores protected against sunlight and dryness by high humidity in a cloud. Nowadays the fungus is present almost everywhere tea is grown in Ceylon and long distance travelling is no more essential for its spread and occurrence.

Therefore there is no purpose in "aerial spraying".

**Question**—Superintendent, New Peacock Group.

Am I to understand from Mr Elias's talk that the savings in costs are only or mainly in respect of labour costs? If so, is there any point, particularly with increasing populations on estates, in substituting machines for men if the operation is carried out equally effectively?

*Dr Mulder*: You can spray an acre with a mistblower so much more quickly and with so much less effort that you can use the sunshine method and increase the number of acres that can be sprayed in a day.

**Question**—Mr Victor Ratnayake, Deniyaya.

Is the cost per acre for one spraying or for a number? Please give cost per acre per spraying.

*Director*: The figure was one rupee per spraying per acre; compared with the normal method of spraying most people will find that one rupee gave quite a good saving.

**Question**—Superintendent, Hindagalla, Namunukula.

The stated cost of spraying at approx. Re. 1/- per acre does not presumably take into account the short life of the equipment. A machine costing about Rs. 1,000/- is said to have a life of 5,000 acres, i.e. about -/20 cents per acre. Including equipment, the total is thus about Rs. 1/25 per acre.

*Mr Elias:* We assume that the life of a machine is 2 years. The price of these machines varies from Rs. 850/- to Rs. 950/-. On the basis of 24 days spraying per month and a minimum of 6 months spraying per annum, the cost on capital outlay is -/16 to -/17 cts per acre, which is less than the questioner suggested.

**Question**—Superintendent, Forres.

What servicing facilities are available for mist blowers?

*Mr Elias:* Messrs Shaw Wallace & Hedges Ltd., of Colombo have facilities for carrying out decarbonization and this is done free once a year. Also their mobile workshop will visit estates once a year and carry out all repairs. They carry all spares necessary. The training of operators free of charge will be done in Colombo. I understand that other firms in Colombo intend to have similar facilities.