

JET-TYPE SPRAY NOZZLE CHARACTERISTICS

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According to "The Formation of Spray Drops from Viscous Fluids" by R. E. Ford and C. G. L. Furmidge, Shell Research Ltd., Woodstock Agricultural Research Centre, Sittingbourne, Kent, England, a fan-jet nozzle produces droplets from viscous liquids in different ways. The "fan" part of the spray produces smaller droplets by what is called a "sheet breakup." At the margins of the fan there are structures, one on each side, called "ligaments," which produce the larger droplets.

Nozzle design and operating pressure govern the formation of edge ligaments. Liquids with very low viscosity may form no significant edge ligaments. An increase of pressure may reduce the formation of edge ligaments.

Spray characteristics are affected by the design of the orifice, by roughness and imperfections. Apparently different makes of nozzles will perform differently. An orifice that has been damaged by wear or by clearing an obstruction with a sharp instrument will have a different spray pattern than when new. Even two similar nozzles from the same manufacturer need not perform alike. Also, within a given nozzle design,

the variation of drop-size will increase with the decrease of the size of orifice.

Ford and Furmidge state: "Since the breakup of the two regions of the spray—ligament and sheet—occurs by different mechanisms, the overall distribution of drop-size obtained will depend on the proportion of liquid entering the two regions."

Cone-spray nozzles are better only in that they do not have an edge ligament. All the other variables are present. Both cone and fan type nozzles are highly susceptible to wear in the nozzle orifice.

The work was done with nozzles that were static or moving slowly. D. Yeo (J. Agri. Eng. Res. 4, 93 [1959]) worked with fast moving nozzles (aircraft sprays) and developed a dimensionless function to compensate for the motion of the nozzles.

Ford and Furmidge also state: "In view of these observations and the theory developed above, it is not surprising that there are many conflicting reports on the effect of viscosity and drop size. It is possible that all the reported observations are correct within the narrow limits in which the observations were carried out. Unfortunately, these limits are not fully reported in much of the published work."

The number of variables inherent in jet-type spray nozzles seems to indicate that this nozzle is poorly suited to applying insecticides at L. V. and U. L. V. rates. They are not the best device for generating a spray of uniform size droplets.

Several members have written to call attention to an error in the "AMCA Miscellaneous Data" which appeared at the end of the Attachments following the minutes of the annual meeting, in *Mosquito News* for June, 1970 (Volume 30, Number 2), page 306.

In the list of presidents of the EAMCW (Eastern Association of Mosquito Control Workers, which later became AMCA), T. J. Headlee was erroneously listed as president in 1939. That year the president was C. T. Williamson, and it is suggested that members who wish to preserve an accurate record should make this correction in the list.