

# Submersed Aquatic Weed Control With Invert Emulsions

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Inverts offer a promising tool for submersed aquatic applications. Laboratory and field tests reveal that the Stull Bifluid System has an application that projects spray to the plant target. Our work has been largely developmental to show that various herbicides need not be applied at a high concentration rate.

Invert (water-in-oil) emulsions offer certain unique characteristics for submersed aquatic vegetation applications. There is definite control of the droplet settling rate in water by regulating droplet weight. Underwater dispersion of invert emulsions, in concentrations of one or more pounds acid equivalent per gallon, enables the user to control specific gravity and have uniform emulsion droplet breakup and size. These heavy, viscous droplets have superior sticking ability on submerged foliage.

There are apparent advantages which are evident with invert emulsions. A greater concentration of toxicant is placed on the submersed plant. There is more intimate contact of the toxicant on the foliage. The open water surrounding treated infestation will be less contaminated. The capability of greater on-target accuracy lowers the total dose rate per acre foot.

Several aquatic herbicides have been tested for submersed dispersal as water-in-oil emulsions. BIVERT-AMX, BIVERT-DPN and BIVERT-MSMA are the neutral spray adjuvants, or emulsifier systems, used in these tests. These concentrate adjuvants are mixed with No. 2 diesel fuel. Test Rates:

Ammonium Sulfamate (Ammate X); oil phase: 1 part BIVERT-AMX to 3 parts No. 2 diesel fuel; water phase: 6 pounds Ammate X in 1 gallon of solution; ratio: 1:6.

Cacodylic Acid (Phytar 160); oil phase: 1 part BIVERT-DPN to 3 parts No. 2 diesel fuel; water phase: 1 part Phytar 160 to 3 parts water; ratio: 1:6. 1:1'-ethylene-2:2'-dipyridylum dibromide (Diquat); oil phase: 1 part BIVERT-MSMA to 3 parts No. 2 diesel fuel; water phase: 1 part Diquat to 3 parts water; ratio: 1:7.

CuSO<sub>4</sub> (Copper Sulfate); oil phase: 1 part BIVERT-AMX to 3 parts No. 2 diesel fuel; water phase: 3 pounds Copper Sulfate in 1 gallon of solution; ratio: 1:6.

Various spray nozzles were used in our work. Spraying Systems D3 with a 25 core gave the best spray droplet and coverage. Spraying Systems TX4 Cone Jet, 73007 T Jet and Stull's 2418 nozzle tips were also used. Nozzle spray pressure of 20 to 40 psi seems necessary.

We have presented in general terms indications that commercial utilization of the Stull Bifluid System for submersed dispersal is possible. There are other uses for this new concept which are currently under investigation. Because of the simplicity of adapting the bifluid system to most existing application equipment, accurate placement and adhering qualities of invert emulsions, offer new dimensions to aquatic weed control.