

Status Of Classification Of Aquatic Herbicides¹

LARS W. J. ANDERSON

*Plant Physiologist, Criteria and Evaluation Division;
U. S. Environmental Protection Agency,
Washington, D. C. 20460*

ABSTRACT

Commencing in 1976, all pesticide products will be reviewed for classification for either "general" or "restricted" use. After 21 October 1977, "restricted" products can only be used by or under the supervision of Certified Applicators. Aquatic herbicide products will be evaluated on the basis of toxicity to humans and wildlife, formulation concentration, use dilution, and method of application and adequacy of label and labeling. It is anticipated that many aquatic herbicides will not meet the toxicological and use dilution criteria for "general use" classification. Those not meeting the criteria will be classified on the basis of adequacy of label and labeling and consideration of other hazards. Since many aquatic herbicides require specialized skill and equipment, it is anticipated that many, if not most, such products will be classified for "Restricted" use. The pertinent classification criteria are discussed.

INTRODUCTION

The criteria for classification of pesticides are briefly discussed in order to relay some current information with regard to aquatic pesticide regulation and the Environmental Protection Agency's (EPA) progress in implementation of the Federal Insecticide, Fungicide, and Rodenticide Act² (FIFRA), as amended. A brief discussion of certification of pesticide applicators will then follow in order to provide some information on the current status of certification plans.

CLASSIFICATION CRITERIA FOR GENERAL AND RESTRICTED USE PESTICIDES

According to Section 3 (d) of the FIFRA, as part of registration, pesticides must be classified as either "general" or "restricted" use; if "restricted," they must be applied by or under the supervision of certified applicators. The parameters to be considered for each product in determining classification are: (1) toxicity, (2) use, and (3) labeling. Certain criteria are used to determine if the pesticide is a candidate for general use. If the criteria for general use are not met, restricted classification is considered. With regard to toxicity criteria, which pertain to the pesticide's active ingredient(s), its formulated concentration, and its final use concentration, the areas of

primary concern for aquatic herbicides are dealt with in Section 162.11(C) of the Section 3 Regulations, namely "Criteria for Determination of Unreasonable Adverse Effects" (Section 3 Regulations pp. 28283-28284). The definition of an unreasonably adverse effect, according to FIFRA (Section 2(bb)) is:

"Any unreasonable risk to man or the environment, taking into account the economic, social and environmental costs and benefits of the use of any pesticide."

Basic mammalian-toxicological criteria for "general" use classification for newly registered products are as follows.

PARTIAL CRITERIA FOR CANDIDACY FOR "GENERAL USE" CLASSIFICATION, NEW PRODUCTS:³

- (A) Has an acute dermal LD₅₀ greater than 200 mg/kg.
- (B) Has an acute dermal LD₅₀ greater than 16 g/kg for the formulation as diluted for use as a mist or spray;
- (C) Has an inhalation LD₅₀ greater than 0.2 mg/liter;
- (D) Is not corrosive to the eye or causes corneal opacity reversible within 7 days;
- (E) Is not corrosive to the skin and causes no more than severe skin irritation within 72 hr; and
- (F) Causes under conditions of label use, or widespread and commonly recognized practice of use, only minor or no discernible subacute, chronic, or delayed toxic effects on man or other non-target organisms from single or multiple exposures to the product ingredient(s), their metabolite(s), or degradation product(s).

In addition to these criteria, terrestrial and aquatic wildlife exposure criteria are as follows.

PARTIAL CRITERIA FOR CANDIDACY FOR "GENERAL USE" CLASSIFICATION, PRODUCTS REGISTERED PRIOR 21 OCTOBER 75:

- (A) Occurs as a residue immediately following application in or on the feed of a mammalian species representative of the species likely to be exposed to such feed in amounts equivalent to the average daily intake of such representative species, at levels less than one-fifth the acute oral LD₅₀ measured in mammalian test animals as specified in the registration guidelines.
- (B) Occurs as a residue immediately following application in or on the feed of an avian species representative of the species likely to be exposed to such feed in amounts equivalent to the average daily intake of such representa-

³Other criteria include maximum wildlife exposure levels for terrestrial and aquatic organisms.

¹Paper presented to the U.S. Army Corps of Engineers, research planning meeting, Charleston, South Carolina, 22-25 October 1975.

²Numerical and alphabetical notations in the text refer to sections or paragraphs in the Section 3 Regulations of the FIFRA, as amended, published 3 July 1975 in the Federal Register.

tive species at levels less than one-fifth the subacute dietary LC_{50} measured in avian test animals as specified in the registration guidelines.

(C) Results in a maximum calculated concentration following direct application to a 15-cm layer of water less than one-tenth the acute LC_{50} for aquatic organisms representative of the organisms likely to be exposed as measured in test animals as specified in the registration guidelines.

(D) The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, only minor or no discernible adverse effects on the physiology, growth, population levels, or reproduction rates of nontarget organisms, resulting from exposure to the product ingredients, their metabolites, or degradation products, whether due to direct application or otherwise resulting from application, such as through volatilization, drift, leaching or lateral movement in soil.

Under the "outdoor applications," (Section 162.11(c) (1)(iii)), the maximum concentration allowed for "general use" is less than one-tenth the LC_{50} for aquatic organisms resulting from application to a 15-cm layer of water. For mammalian and avian feed, the maximum residue level criterion (immediately after application) is one-fifth less than the LD_{50} or less than the LC_{50} value respectively, for the test species indicated in the guidelines. The one-fifth safety factor is arrived at from consideration of typical doseresponse curves for tested species. Such plots indicate that dosages of one-fifth LD_{50} or one-fifth LC_{50} are likely to produce 0.1% and 10% mortality, respectively. The aquatic safety factor of one-tenth LC_{50} is obtained by incorporating an additional two-fold safety factor to provide for the general inability of aquatic organisms to escape pesticide exposure.

If these concentration criteria are not met, further consideration for "general" classification will be given with regard to adequacy of the label and labeling to prevent unreasonable adverse effects, as follows.

CRITERIA FOR ADEQUACY OF LABEL AND LABELING, TO ALLOW "GENERAL USE" CLASSIFICATION:

(i) To follow label directions, the user of a pesticide product would not have to perform complex operations or procedures requiring specialized training and or experience;

(ii) Failure to follow the use directions in any minor way would result in minor or no discernible adverse effects;

(iii) Widespread and commonly recognized practices of use would not nullify label directions relative to prevention of unreasonable adverse effects on man and the environment;

(iv) The directions do not call for specialized apparatus, protective equipment or material unless they would be expected to be available to the general public;

(v) Following directions for use would result in only minor or no discernible adverse effects of a delayed or indirect nature, such as through bioaccumulation, persistence, or

pesticide movement from the original application site, on nontarget organisms.

The basic philosophy behind these criteria is that use of extraordinary methods of application or specialized equipment or both, implies a need for knowledge exceeding that which could reasonably be expected in the general public, hence "restricted use" is warranted.

Since many aquatic herbicides would exceed the one-tenth LC_{50} values based on a 15-cm layer of water, the label criteria become decisive. It seems reasonable to expect that criteria (i), (ii), and (iv) will also not be met by most uses of aquatic herbicides, in which case a "restricted" classification will result. For example, aquatic herbicide applications may require use of specially modified boats, pumping equipment, metering devices and air-blowing devices. In addition, it may be necessary to know general water quality conditions (e.g. pH, alkalinity, hardness, temperature) in order to determine the most appropriate treatment dosage and time of application. If a pesticide has both "general" and "restricted" uses, there are two labeling options:

- (1) one product having both general and restricted uses which could only be sold to, and used by certified applicators (even for the general use) (Section 162.10(j) of Section 3 Regulations) or,
- (2) two products (with the same active ingredient(s)): one "general use" label and one "restricted use" label.

It should be noted that since classification criteria are applied to the use conditions of each pesticide, as well as to the active ingredient(s) review must be on a product-by-product basis. It is anticipated that this will be accomplished during the reregistration process commencing in 1976.

CURRENT STATUS OF STATE CERTIFICATION PLANS

According to Section 4 of FIFRA, as amended, EPA is charged with prescribing standards for certification of pesticide applicators of "restricted" products. A governor of a State wishing to certify applicators must submit his State's plans to the appropriate Regional EPA Administrator to gain EPA approval. The "Government Agency Plan (GAP) for Certification of Federal Employees or Applicators of Restricted Use Pesticides," has been developed under the auspices of the Federal Working Group on Pest Management. Originally, this plan was to meet the requirement of qualifying pesticide applicators in the various agencies of the Federal Government to meet the Federal standards. At this time, however, plans for Government Agency qualification are not developed and the future of G.A.P. is uncertain. In any event, GAP plans will have to be in accord with approved State plans.

The concern of federal applicators is that technically, without a "blanket" Federal Certification, they would have to be certified by each State in which they operate. Practically speaking, however, reciprocity between States and conformity to a common set of EPA standards may obviate the need for multi-State certifications. Some States, within

TABLE 1. STATUS OF STATE CERTIFICATION PLANS. STATES ARE LISTED UNDER THE HEADING (STEP) WHICH CORRESPONDS TO THEIR STATUS AS OF 12 MARCH 1976. DATES OPPOSITE EACH STATE LISTED UNDER THE LAST TWO STEPS (7,8) INDICATE WHEN THE INTENT TO APPROVE, OR APPROVAL NOTICE WAS PUBLISHED IN THE FEDERAL REGISTER.

Status of State Certification Plans ^a			
1 Draft State Plan Under Development—2			
Alabama			
Louisiana			
2 EPA Review—(Draft State Plan and Legal Authorities)—17			
Massachusetts	Kansas	North Dakota	
Delaware	Missouri	South Dakota	
Vermont	Rhode Island	Utah	
Colorado	Nebraska	Ohio	
Illinois	Kentucky	Oklahoma	
Alaska	Texas		
3 Final State Plan Development—5			
California	District of Columbia		
New Mexico	Connecticut		
Wisconsin			
4 Submission to State Lead Agency Head—0			
5 Submission to Governor—2			
New York		Arizona	
6 Review of Governor Signed State Plan—16			
Florida	Guam	Virginia	Virgin Islands
Hawaii	New Hampshire	Nevada	Minnesota
N. Carolina	Indiana	Tennessee	Michigan
Montana	Maryland	Maine	Arkansas
7 FR Notice—Intent to Approve State Plan—6			
Oregon—11 Dec.		New Jersey—30 Dec.	
West Virginia—23 Dec.		Pennsylvania—4 Mar.	
Idaho—26 Nov.		Puerto Rico—10 Mar.	
8 FR Notice—Approved State Plan—6			
Georgia—8 August		Mississippi—11 Feb.	
Iowa—16 September		Wyoming—29 Jan.	
South Carolina—6 Jan.		Washington—18 Feb.	

^aTTPI and American Samoa are not included as development of drafts in abeyance pending decision on need.

a common region, have developed or are developing certification plans in concert, for example: Idaho, Washington, and Oregon. But, before any reciprocal agreements are established, most states will scrutinize their neighboring States' plans for compatibility. The main difference between State requirements would most likely have to do with demonstrated knowledge of local pest problems and environmental conditions.

Table 1 shows the present (as of 12 March 1976) status of State certification plans. As of now, six States have plans which have been given tentative (1 year) approval by EPA: Iowa, Georgia, South Carolina, Mississippi, Wyoming, and Washington. The approval is contingent upon enactment and promulgation of proposed legislation and regulations by the State within one year. Other states have submitted plans which are under final EPA review. Some states have not yet submitted plans. Congress passed legislation that extends deadlines until 21 October 1976 for submission of State plans, and 21 October 1977 for certification of pesticide applicators.

Aquatic herbicide application is treated as a separate category under State plans. Demonstration of knowledge of certain areas of basic aquatic biology will be required, as well as specific knowledge of the use of aquatic herbicides, methods of calculating dosage levels, etc. It may be of interest that applications of pesticides for mosquito control are covered under a separate section of state plans, "Public Health Pest Control." One can imagine, however, some cross-over between these two aquatic categories, for example, in control programs involving reduction of potential mosquito habitats by control of aquatic weeds.

IMPACT ON AQUATIC PESTICIDE APPLICATORS

Since most aquatic weed control programs are handled by trained, competent personnel through Federal, State, local or commercial entities, difficulties in meeting certification requirements most likely would be negligible. Demonstration of competency in application and general knowledge of basic aquatic biology should pose little problem to those currently operating in this area. It is probable that, for public employees, costs of certification (but not necessarily training) will be waived. Training and certification programs are underway at this time.