Letters

Defoliation Effects on Forest Ecology

The contention that defoliation produces a striking change in the ecology of the sprayed locality is sound enough. Beyond this generality, Perry's letter is misleading ("Vietnam: Truths of defoliation," 10 May). His message appears to be critical of government policy on grounds that ecological effects of herbicides are disastrous; one may gather from his remarks that our policy is to poison large areas of habitat for man, bird, and beast so as to exterminate all living things.

Most of the brush and weed control chemicals used for defoliation, including 2,4-D, 2,4,5-T, and cacodylic acid have a broadly selective action, and all of these are being used in our own country in much the same way to *favor* some component of vegetation. Picloram is the only defoliant to my knowledge that has persistence beyond the first few months, and this persistence has no effect on graminaceous species. Essentially all vegetation has remarkable capacity to recover after applications which Perry described as biocidal. In fact, the difficulty often encountered is that one application simply did not desiccate enough of the vegetation to provide a fuel base to scorch-resistant species.

The observation that wildlife is absent in sprayed areas is generally not accurate. High forest is not particularly good habitat for many animals, birds, and insects, and game biologists commonly use herbicide techniques to defoliate forest areas considered prime game management units. The reason for this is that most food in high forests is beyond reach of animals, and sprouts and herbaceous species become abundant shortly after treatment. The negligible toxicity and attendant lack of harmful effects of herbicides are well documented. Moreover, the brief hiatus in primary productivity is almost always followed by a period of vigorous growth of plant communities which are often of greater productivity than the untreated forest.

The philosophical argument against the use of unsolicited biological agents is understandable. But such tactics should not be criticized on the basis of genocidal, biocidal, ecological, or economic considerations because the land and the organisms it supports will recover from such treatment more quickly than from various other instruments of war, and with far less pain. Wouldn't it be more constructive to recommend ways of making the use of all such instruments unnecessary?

MICHAEL NEWTON
Forest Research Laboratory,
Oregon State University,
Corvallis 97330

Perry does not specify the kinds of vegetation where "Doses over 3 pounds per acre (3.36 kilos per hectare) of the standard mixture of 2,4-D and 2,4,5-T . . . kill all the foliage and twigs they contact." Since the very early days of experimentation we have never used less than 4 pounds of active ingredient per acre (4.45 kg/hectare) for mature shrub and tree vegetation, and usually much more. Yet, I have examined thousands of acres—both experimental trials and field-scale applications—where 4 pounds per acre on mature stands produced no evidence of treatment, or very little evidence. We concluded it simply was not practical to control mature stands with these low dosages. The problem is that, even when applied as an extremely high-volume spray, so limited a quantity of effective agent comes in contact with a very small proportion of the foliage. In multistoried tropical or subtropical forests composed largely of species that sprout readily and having a total leaf area of many times the area of ground surface, doses on the order of 3 pounds of active ingredient per acre are so widely dispersed that they tend to produce only a short-term physiological setback causing trees to lose part of their leaves temporarily, an effect correctly termed *defoliation*; that is, the result claimed by the Department of Defense. I have yet to see a single insect or bird that was killed as a direct result of application of 2,4-D or 2,4,5-T to vegetation.

Possible effects of the above materials on animals and humans, and of others used in control of woody vegetation—picloram, cacodylic acid, and so forth—are rigorously ascertained and verified by governmental regulatory agencies before they are registered for use by the public. Both 2,4-D and 2,4,5-T have been determined to be no more than slightly toxic, even at rates far above those which might be applied inadvertently. For 2,4-D the minimum dose killing 50 percent of the animals (LD_{50}) is 400 to 500 mg per kilogram of body weight; 2,4,5-T is even less toxic, the LD_{50} being 300 to 800 mg per kilogram of body weight.

When herbicides are used to desiccate woody vegetation for controlled burning, the very fine dry fuels burn before twigs and stems ignite, indicating only a remote possibility of any significant fire in defoliated forests with moisture conditions and fuel structure like those in Vietnam.

Perry states that DOD "commandeered the entire U.S. production of 2,4,5-T for 1967 and 1968" and that, combined with other chemicals DOD may be using, it would "kill 97 percent of the aboveground vegetation on over 10 million acres." This statement is pure conjecture. Obviously, if the production of 2,4,5-T had not been "commandeered" by DOD it would not have been wasted, but it would have been used for industrial and agricultural weed control: on weeds on agricultural lands; on unwanted woody vegetation along railroads and power lines; on shrubs on range lands; in improving forest regeneration; and even for wildlife-habitat improvement. This production would cover the same number of acres of land, and "kill" the same amount of vegetation anywhere in the world.

Why is it any more objectionable or morally reprehensible to use these chemicals—licensed as safe for use by the general public—for military purposes in Vietnam, where ideals of the free world are at stake, than it is to use them for industrial and agricultural purposes at home?

L. T. BURCHAM
4701 Crestwood Way,
Sacramento, California 95822