United States Department of Agriculture

Animal and Plant Health Inspection Service

Karnal Bunt Cooperative Regulatory Program

Environmental Assessment, September 1996

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I. Need for the Proposed Action

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), is proposing a cooperative regulatory program for Karnal bunt disease. The pathogen of Karnal bunt disease has been detected recently in the States of Arizona, California, and New Mexico. The proposed regulatory program, which may expand if additional infestations of Karnal bunt are detected, would involve the establishment of quarantines and regulatory treatments for infested commodities or equipment capable of harboring Karnal bunt disease. Because of the disease's potential to result in crop losses, economic damage, and loss of export markets, the Secretary of Agriculture has issued a "Declaration of Extraordinary Emergency Because of Karnal Bunt."

Karnal bunt, or partial bunt, caused by the smut fungus *Tilletia indica* Mitra (synonym *Neovossia indica* (Mitra) Mundkur), is a serious exotic fungal disease of wheat, triticale, and durum wheat. The disease causes crop losses when wheat kernels are converted to masses of fungal spores, and it also causes loss of grain quality because of the presence of a fungal product, trimethyl-amine, that produces a fishy odor.

APHIS' authority for action in this proposed program is based upon and complies with the Incipient and Emergency Control of Pests [Act] (1937), the Organic Act of the Department of Agriculture (1944), and the Federal Plant Pest Act of 1957. The Federal Plant Pest Act of 1957 (7 U.S.C. 150dd) provides the authority to initiate specific emergency actions until emergency regulations can be published in the Federal Register. This environmental assessment (EA) analyzes in a programmatic manner the potential effects of the proposed program and alternatives, including no action. This EA includes analysis for additional seed treatments and regulated items not included in the earlier Karnal bunt program and replaces the previous "Karnal Bunt Cooperative Regulatory Program, Environmental Assessment, March 1996."

II. Alternatives

A. No Action

Under the no action alternative, there would be no Federal effort to quarantine, control, or otherwise contain outbreaks or infestations of Karnal bunt fungus in wheat or other host plants. There would be no Federal restrictions on the movement of Karnal bunt-infested commodities within the United States. Any measures taken to control or contain Karnal bunt would have to be taken by State or local governments, grower groups, or the growers themselves. If non-Federal efforts were unsuccessful at controlling or containing the infestation, extensive applications of pesticides might be needed to prevent further crop losses. Economic losses could force growers to plant other crops that are not hosts of Karnal bunt. Karnal bunt eventually could become distributed over its maximum potential range in the United States (all areas where wheat and closely related grains are grown). Foreign countries which have exterior quarantines for Karnal bunt would no longer import wheat from the United States. Other countries which traditionally have obtained their wheat from the United States

might enact similar quarantines. Loss of U.S. export markets would result in substantial economic losses to the agricultural industry.

Potential advantages of the no action alternative appear to be minimal, if not nonexistent. Conceivably, one could consider the lack of a need to apply Federal resources to the problem to be an advantage, but that advantage would be outweighed substantially by the lack of coordination and economic losses that would result from implementation of a no action alternative.

Potential disadvantages associated with this alternative include (1) the establishment and spread of Karnal bunt in the United States; (2) increased agricultural and economic losses for the United States; (3) lower quality of grain commodities; (4) loss of export markets; (5) loss of employment for some citizens; (6) increased and uncoordinated commercial use of pesticides, with associated adverse environmental impacts; (7) reduced cooperation among Federal, State, and local governments in pest management; and (8) loss of interagency research efforts to develop more effective control, containment, and eradication of Karnal bunt fungus (e.g., USDA, Agricultural Research Service efforts).

B. Regulatory Program

Under the regulatory program alternative, Federal efforts would focus on containing Karnal bunt in currently infested areas. First, the infested areas would be delimited and quarantine boundaries established. Commodities and equipment capable of harboring Karnal bunt would be regulated, restricted to movement within the quarantined area, or treated (refer to table 1, section III, for a list of regulatory controls) before they could be moved out of the quarantined area. Existing infestations would be allowed to remain and Karnal bunt spores could be transported by wind to host plants outside the quarantine areas, resulting in the continued expansion of the infested areas (and, therefore, the quarantined areas). State governments or other entities could take actions, as they deemed appropriate, to eradicate or contain Karnal bunt.

Potential advantages associated with this alternative include (1) prevention of human-assisted spread of Karnal bunt; (2) reduction of adverse effects from the use of pesticides in expanding eradication and/or control efforts; (3) slower spread of Karnal bunt (with dissemination principally by the wind-borne route); and (4) continuance of some interagency research efforts to develop more effective controls, containment, and eradication of Karnal bunt.

Potential disadvantages associated with this alternative include (1) the continued spread of Karnal bunt, (2) some required commercial use of pesticides, and (3) some disruption of commerce in the quarantined area.

III. Environmental Impacts of the Proposed Action and Its Alternative

The environmental consequences that may result from implementation of the proposed program and its alternative are considered in this section. Because the principal environmental concerns (even in the case of no action) relate to the use of chemical pesticides, this EA, therefore, focuses on the potential effects of chemical pesticides.

A. No Action

Under the no action alternative, there would be no Federal effort to quarantine or contain any infestations of Karnal bunt. Any control or containment efforts would be at the discretion of State or local governments, grower groups, or individual growers. Depending upon the scope and intensity of those actions, a range of environmental impacts may be anticipated. The response of growers to the presence of Karnal bunt will likely depend on real and perceived extent of the threat to their economies; the attainment of economic crop damage thresholds could result in growers switching to other crops or beginning vigorous treatment programs. The lack of coordinated eradication or regulatory programs would mean that growers could use any approved pesticides to combat Karnal bunt; the spread of the infestation would mean that pesticide use would continually increase.

The consequences to human health under no action relate primarily to the direct and indirect effects of the non-Federal use of pesticides. Because there would be less control over the types and amounts of pesticides that could be used, the adverse effects would conceivably be greater than those incurred under a Federal regulatory program or a Federal eradication program. Greater numbers of people in wider geographical areas could be exposed to pesticides for longer periods of time than if there were Federal involvement. Human health risks depend on the type of pesticide and application method used, but it is likely that the resultant adverse effects from pesticide exposure to humans would be greater under this alternative than for the other.

The consequences to nontarget species under the no action alternative would be anticipated to be more severe than under the other alternative, for the same reasons as those for human health. Because the pesticides, application methods, quantities used, areas of application, and specific nontarget species responses are unknown, it is not possible to estimate with certainty the effects of no action on nontarget species. Again, it is reasonable to expect that the adverse effects from pesticide exposure to nontarget species would be greater under this alternative than for the other.

The consequences to components of the physical environment (air, soil, and water) would also be expected to be more severe, in that pesticide usage could be expected to gradually increase under this alternative, as the infestations increase in area. The need for additional treatments in areas over protracted time periods would result in continued decreases in environmental quality.

B. Regulatory Program

Under a regulatory program, the Federal action would be to treat, destroy, or otherwise dispose of any regulated product or article (those that are infected or could be infected by Karnal bunt). Regulated articles include, but are not limited to, the following: wheat, seeds, root crops with soil, milling products and debris from wheat processing, grain elevators, mechanized equipment, farm tools, bags, sacks, and containers. Regulatory treatments are listed in table 1.

Table 1. Regulatory Treatments

Method	Amount
Methyl bromide fumigation	15 pounds (lb) per 1,000 cubic feet for 96 hours
Steam heat	160 °F at point of contact
Sodium hypochlorite	1,500 parts per million (ppm) solution at rate of 1 gallon chlorine bleach mixed with 2.5 gallons of water
Hot water and detergent	Pressure of 30 lb per square inch at 160 °F
Seed treatment	0.91-1.67 lb carboxin, 0.91-1.67 lb thiram, and 2.23 lb pentachloronitrobenzene per 100 lb of seed
Germplasm seed treatment	1.5% aqueous solution of sodium hypochlorite containing 2 millimeters of Tween 20™ followed by 0.91-1.67 lb carboxin, 0.91-1.67 lb thiram, and 2.23 lb pentachloronitrobenzene per 100 lb of seed

The risks associated with steam treatment and hot water treatment are limited to burns to the applicators and should not occur if the equipment is handled using proper safety precautions. Adverse environmental effects of the regulatory treatments are related principally to the use of the chemicals—sodium hypochlorite, methyl bromide, carboxin, thiram, and pentachloronitrobenzene.

Sodium hypochlorite (chlorine bleach) is a corrosive chemical that is capable of causing skin burns. Applicators are required to wear proper protective gear when disinfecting contaminated surfaces and are required to adhere to rigorous safety procedures. Applicators who adhere to the required safety procedures will not sustain burns to the skin, damage to lungs, or show any other symptoms of exposure from the effects of sodium hypochlorite. No adverse effects to nontarget species or the physical environment would be anticipated for the disinfections, which would occur in contained and restricted locations.

The seed treatments consist of applications of disinfectant and fungicides. The hazards and safety procedures for disinfections with sodium hypochlorite are described in the previous paragraph and apply to seed treatment applications. The addition of the surfactant, Tween 20™, does not result in high risk or require a change in safety procedures. Proper protective gear is required to avoid skin exposure and

inhalation when treating seeds with the fungicides (carboxin, thiram, and pentachloronitrobenzene). Exposure to carboxin is unlikely to pose any adverse effects without protective gear, but the other fungicides pose greater risks and require the use of proper protective gear. Thiram is a skin sensitizer, and a primary metabolite of thiram has been shown to be an animal carcinogen. These effects can be avoided by minimal exposure through the use of proper protective gear. Pentachloronitrobenzene has been shown to react with blood cells to form methemoglobin. This binding of hemoglobin is only detectable with high exposures or cumulative exposures. Certain individuals with high methemoglobin levels (such as smokers) are at higher risk of adverse effects. Inhalation tests of pentachloronitrobenzene have shown carcinogenic effects in animals at high exposures. The required use of proper protective gear for applications of pentachloronitrobenzene assures that occupational exposures will not result in any significant adverse effects. Residues of the disinfectant and fungicides used in seed treatments do not persist long after planting, and the low concentrations in the environment from planted seed pose no significant risks to wildlife or environmental quality.

Fumigations with methyl bromide are conducted in temporary or permanent exposure chambers following guidelines in the APHIS "Plant Protection and Quarantine Treatment Manual." Adherence to these guidelines protects the applicators and general public from exposure and any adverse effects of methyl bromide. There is a 30-foot (10-meter) area around the fumigation chamber where entry is restricted to individuals wearing self-contained breathing apparatus when a fumigation is being conducted. When the prescribed treatment period is over, the chamber is aerated with ventilation fans and the methyl bromide is vented into the atmosphere.

Methyl bromide gas is heavier than air, is highly volatile, and disperses rapidly when released. Brief airborne accumulation of methyl bromide could occur in low areas adjacent to treatment facilities. The risk of adverse effects to humans from fumigations is prevented by dispersion and mixing within the 30-foot restricted area, but wildlife directly below the chamber vents would be at increased risk. After venting, some methyl bromide may reach adjacent soil or surface water, but little impact is anticipated. The half-life of methyl bromide is less than 7 hours in water and less than 8 days in soil.

The U.S. Environmental Protection Agency (EPA) has classified methyl bromide as an ozone-depleting chemical, similar to chlorofluorocarbons (CFC's) and other halogen gases, and is requiring that the production and use of the compound be phased out by the year 2001. Halogen gases have been implicated in ozone destruction in the stratosphere, and ozone depletion has been identified as a contributing factor in the anticipated rise in the incidence of skin and other cancers associated with increased exposure to ultraviolet light.

A number of factors suggest that methyl bromide associated with agricultural fumigation may be of limited importance in ozone depletion. Methyl bromide has a short atmospheric half-life compared to CFC's (1.6 years versus 80-100 years). Also, a large percentage of atmospheric bromine may be generated naturally by marine wave action, whereas industrial and agricultural sources contribute from 10 percent to

35 percent. Some industrial sources associated with the manufacture of polyester fibers release into the atmosphere nearly 1 million pounds of methyl bromide in a year . Thus, the contribution from agricultural methyl bromide would be small relative to natural and industrial sources of bromine. The total amount of methyl bromide required by APHIS (for all of its programs) in Fiscal Year 1992 contributed less than one-half of 1 percent of the atmospheric load of methyl bromide from all human uses.

APHIS analyzed its use of methyl bromide for certification of imported logs, lumber, and other unmanufactured wood products in an environmental impact statement (EIS), incorporated by reference in this EA. For 1992, it calculated only a 0.0000042 percent increase in ozone depletion from program use of methyl bromide, an insignificant change. Although fumigations with methyl bromide would be expected at some facilities, relative few fumigations will be required. Since infected seed can be handled through milling, incineration, or burying at a sanitary landfill, the lower costs of these actions make fumigation of infested seed unlikely. Disinfections of surfaces will suffice for many of the treatments needed. There will, however, be some facilities that will need to be fumigated (primarily grain elevators and storage bins). This limits the number of fumigations required and the amount of methyl bromide needed. This cost-saving approach to handling contaminated materials by the program has the indirect effect of decreasing the potential ozone depletion resulting from the regulatory treatments.

IV. Agencies, Organizations, and Individuals Consulted

This environmental assessment was prepared by the Animal and Plant Health Inspection Service, Biotechnology, Biologics, and Environmental Protection, Environmental Analysis and Documentation. It was reviewed by the Animal and Plant Health Inspection Service, Plant Protection and Quarantine, Domestic and Emergency Operations. Their addresses follow.

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Finding of No Significant Impact
Karnal Bunt Cooperative Regulatory Program
Environmental Assessment, September 1996

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) for a proposed cooperative regulatory program to quarantine and contain karnal bunt, a serious exotic fungal disease of wheat, durum wheat, and triticale (a hybrid of wheat and rye). The proposed program is needed to reduce crop losses, economic damage, and loss of export markets that would result from the adverse effects of karnal bunt. The EA, incorporated by reference in this document, is available from:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine, WRO
9580 Micron Avenue, Suite I
Sacramento, CA 95827

or

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine, CRO
3505 Boca Chica Blvd., Suite 360
Brownsville, TX 78521-4605

The EA analyzed two alternatives—no action and the regulatory program. Under no action, there would be no Federal action to control or otherwise contain the Karnal bunt infestations. Under the regulatory program, Federal actions would be restricted to only those actions related to containing the existing infestations.

Based on the information presented in the EA, I have selected the regulatory program as the preferred alternative because of its capability to achieve the program's objective in a way that reduces the magnitude of potential environmental consequences.

APHIS considered the potential environmental consequences of each alternative. Based on program operational and safety methods, APHIS has determined that there would be no significant impact from the implementation of the regulatory program. APHIS' finding of no significant impact for this program was based upon the appropriate use of the treatments for the program and their expected environmental consequences, as analyzed within the EA. APHIS will consult with the U.S. Fish and Wildlife Service to ensure that this program will have no adverse effects on endangered and threatened species.

It also appears, consistent with Executive Order No. 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” that implementation of the regulatory program will not result in disproportionately high and adverse human health or environmental effects on any minority populations and low-income populations.

APHIS will implement the preferred alternative because it has the greatest chance of achieving the program objective with the least overall risk to human health and the natural environment.

Alfred S. Elder
Acting Deputy Administrator
Plant Protection and Quarantine

9-27-96
Date