INCREASED AGRICULTURAL PRODUCTIVITY IN AN EARTH DAY ERA

By

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Until about three years ago, few of us had heard much about sunflower oil from Russia. Then, in 1967, the Russians grew a massive crop. Their sunflower seed yields reached a record high of 1,134 pounds per acre on almost 12 million acres. When Russia started dumping that huge crop on the world market, vegetable oil prices skidded downward. So, we had better brace ourselves for competition.

All of us here today are interested in increasing agricultural productivity, and it is easy to understand why you people have a special sense of pride in your association with the development of sunflower acreage and production of sunflower oil and I might add, the development of new and improved varieties does credit to your determination and abilities.

Because sunflowers will grow almost anywhere, farmers all over the U.S. are trying them as an agricultural crop. They offer farmers an alternative cash crop on which familiar crop production methods and equipment can be utilized. Sunflowers probably will become more competitive with other crops as continuing research leads to increased yields per acre, greater disease- and insect-resistance, and higher oil content.

As many of you are aware, for the country as a whole, probably the most generally destructive pest of sunflowers is the larvae of the sunflower moth. This little insect which is not even as big as its name (Homoeosoma electellum (Hulst)), lays its eggs on the sunflower head at flowering time. And if numerous enough, the larvae can destroy every seed in the field. Where this insect is present in numbers, chemical control measures are essential.

My own company, American Cyanamid has been involved in extensive research on this particular problem with two chemicals, Malathion and Cygon. Cygon is one of the new systemic insecticides that we have been developing. Systemics are absorbed into the root system and translocated throughout the foliage. They show great promise for allowing pin-point application and preclude harming non-target organism while giving maximum protection to the desired crop.

While we are on the subject of agricultural chemicals, let me point out that in recent months we have experienced a multitude of exercises pertaining to Earth Day. I wonder how many people know what is meant by an "Earth Day"? I'm not quite sure that I do. These movements have arisen from the public's concern for the total quality of the environment. And as a matter of fact, the environment is replacing Vietnam as the number one issue on college campuses today. This concern is not confined

merely to persons of college age. My own concept of an Earth Day involves the determination of and possible solution to problems of preserving the natural beauty of the earth and its natural resources. Our concern over the quality of the environment is realistic and unquestionably long overdue.

Most of our problems have arisen as a result of the increase in population, concentration of this population in urban areas, and an increasing affluence, which means more goods, and in turn, more waste. The rapid increase in numbers of people contributes to an increase in the total amount of waste and potential pollutants being discharged each day on a non-expanding earth. With increases in prosperity and technological advances, both the quantity and variety of goods that we use increases. This rapid increase of our technology has also increased the number of problems facing our environment.

Americans account for only 6% of the world's population, but we consume 35% of its annual output of raw materials and create mountains of waste to be disposed of in the process. For many years, the chemical industry has been working on these problems and has made truly major achievements in the field of pollution control.

For instance, American Cyanamid's investment in pollution control and solid waste disposal equipment through 1969 was $42 million. The operational cost for this equipment is $9.5 million and the equivalent of 100 full time employees assigned to pollution control operations. So, manufacturers do strive to conduct operations in such a way as to minimize the impact of their products on air, water, and soil (3).

One particular area singled out for attack in recent years has been agricultural chemicals and particularly the chemical industry that researches and manufacturers them. In addition to private industry, those departments and staffs of the land grant college experiment stations and federal offices which are charged with responsibility of development, application, and proof of safety of each new compound, the new uses of established compounds have also come under attack by the environmentalists. These federal and state groups have been openly accused of aiding and abetting the alleged dominance of industry over the federal and state administrative and experimental station operations for the expressed purpose of unloading untested, untried, and unsafe compounds upon an unsuspecting public for profit. The chemical industry has been indicted and convicted before the public as a polluter and a contaminator of the environment. It has been called a poisoner of our foodstuffs, a destroyer of wildlife, and a befouler of the purity of our landscapes and waters beneath. Groundless as these implications are, the fact remains that a large segment of the American public, frightened by sensational anti-chemical forces propaganda, has come to regard industrial chemistry, as an enemy of mankind. This is a real problem confronting the chemical industry, and agriculture today. Although these accusations are untrue, nevertheless, we have a vast educational and informational program ahead of us (4).

That there is environmental pollution is an undisputed fact. That it stems primarily from agriculture's use of pesticides and plant nutrients is not a fact. The point is that pesticides and fertilizers represent only one element which man has injected into his environment in recent years. And they must realistically be considered in that light so far

as environmental goals are concerned.

We would all agree that the American public should be concerned about human safety and about the purity of the environment. We would also agree that the American people need to know the true extent of contamination and pollution and the truth about on whose shoulder the responsibility lies. We would also agree that the American public and people in other countries who buy our agricultural products have a rightful concern about pesticides and fertilizer contamination. But the public also needs to know of the benefits America and the rest of the world derive from the continued efficient, safe, use of chemicals. All aspects of the question should be seed in their proper context (1).

In spite of recent criticism directed at the use of agricultural chemicals in the production of man's food and fiber and maintenance of public health, the undisputable fact remains that without these powerful tools, modern agriculture, as now practiced, would be completely impossible. The public needs to be made aware of how great our dependence on the use of chemicals in agriculture actually is.

Some 10,000 species of insects in the U.S. are enemies of man, agriculture, and natural resources. Several hundreds of these are particularly destructive. Besides insects, there are 600 species of weeds, 1,600 plant diseases and 1,500 species of nematodes which are capable of causing serious economic loss. It is estimated that even with billions of dollars spent each year to curb pests; these insects, diseases, nematodes, and weeds cut U.S. agricultural production by one fourth. Without any of the pesticides, herbicides and fertilizers which are being used, experts doubt that we could provide adequate quantities of food and fiber on our current acreage for more than 40% of our population. Prices of farm products would skyrocket. Instead of getting our diet for 17% of our disposable income, easily the lowest in the world, we might be forced to devote 40% or more for food (1). Chemicals are as vital to agriculture as sunlight and water. Nobody should seriously advocate a sudden and complete withdrawal of chemicals from all of agriculture.

The agricultural chemical industry is opposed to any such overall prohibition or ban of pesticides where the incrimination is based upon unqualified sources. We are, however, in favor of the careful evaluation of each use of these products. We feel, that consideration should be given to the agricultural, economic, environmental and alternate compound aspects of each use, and where advisable, phase out any undesirable uses as rapidly as possible.

In developing a new pesticide, costs range from $2.5 to $6 million, and anywhere from three to five years from time of syntheses to market. The financial risk is enormous.

The U.S. Department of Agriculture, under the terms of the Federal Insecticide, Fungicide, and Rodenticide Act, has the authority to regulate the use of pesticides in interstate commerce. Registration of each compound is required by the USDA and such registrations are reviewed by the U.S. Department of Interior for uses which may have an impact on fish and wildlife resources and by the Department of Health, Education, and Welfare from the standpoint of human safety and health. This joint review is conducted before registration is granted. At any point of the

registration procedure, any of these agencies may require additional field studies, residue analysis, toxicology or other data to assure them that the compound will perform as claimed, and that it will not pose undue hazard to man or natural resources (2).

When pesticides are to be used on a food crop, then a tolerance must be established by the U.S. Food and Drug Administration and this, too, must be granted before the USDA will register the product. By the time a pesticide is finally registered, the safety to man and his environment has been carefully investigated and assured when the product is used according to its labeling. This is why we have "STOP, READ THE LABEL" printed on each package.

The public must be made to recognize that the regulatory agencies are capable of guiding us toward the best possible balance between a clean environment and an adequate food supply and freedom from disease.

It is contended that biological controls using predators, insect pathogens, sterile male techniques, resistant varieties of crop plants, cultural techniques, and an integration of any or all of these methods should be practiced while using only minimal dosages of those chemicals which are non-toxic to vertebrates, have short residual activity, and are highly specific against target insects. Actually the non-chemical control techniques which have been developed can provide us very limited crop protection. It can be stated that there is not a single plant or domestic animal that can be economically produced to meet government grade requirements and be completely protected against all insect pests and all diseases solely by non-chemical methods of control

Industry agrees with the integrated control concept by as yet such techniques are completely inadequate to assure the fulfilling of our demands for food and fiber. The issue is not whether we should use chemical fertilizers and pesticides. We have no choice.

Recent emphasis on the quality of the environment has caused a re-evaluation of the benefit-risk equation as a sound basis for regulation of pesticides. The benefits of using pesticides must be carefully compared to the risks involved and sound judgments made. These judgments should be made by those scientifically and technically qualified to make them on a national basis. The decision should not be left to non-professional people or legislators. There have been mistakes in chemical use and there will be mistakes in the future, but what we have are problems not catastrophes beyond redemption. Problems can be solved and I assure you that the keenest minds in the field including industrial, state and federal personnel are working steadily toward their solutions.

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