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Issues and Recommendations

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Issues and Recommendations

OECD member governments recognize the increasing demands on agriculture to supply nutritious and safe foodstuffs for the growing world population. This production takes place within a complex matrix of biological and physical factors that contribute to our agricultural environment. Modern agricultural systems have often overlooked the health of our agricultural environment, concentrating on inputs of pesticides and other chemicals to maximize productivity. To move towards long term sustainability in agricultural systems it is essential to make full use of our existing biological resources and add new agents where necessary or feasible. This should be undertaken in a manner that ensures food, producer and environmental safety within the context of sustainable pest management utilizing biological control.

Biological control seeks to purposely enhance pest mortality induced by natural enemies by conserving natural enemies, augmenting natural enemy populations, and introducing new, more efficacious natural enemies. These new enemies with enhanced biological control ability can be produced by genetic transformation. Alternatively, the transfer and expression of these genes into crop plants may directly render them with similar biological control capacities as the original biological control agents. Finally, biological control also measures and demonstrates the impact of natural enemies or their genetic material on target and non-target host populations.

To achieve greater sustainability in our agricultural systems and pest management the following issues must be addressed:

SUSTAINABLE PEST MANAGEMENT

Recommendation

Governments should exercise leadership in developing policies and programs that support biological control, including the use of transgenic organisms, as a key component of sustainable pest management. These policies should incorporate the following elements:

- Supporting regulatory processes that recognize all costs and benefits (including environmental) of pest management techniques when comparing biological control agents with those that are less sustainable;
- Evaluation of potential control techniques in a consistent manner, based on an understanding of the biology and ecology of the target organism, crop and control technique and, as far as possible, incorporating an evaluation of the inherent risk of each technique;
- Ensuring that the incentives, support and infrastructure for research, development and extension favour the most environmentally benign techniques and discourage the use of environmentally harmful practices that are ultimately unsustainable.

Rationale

OECD member countries, both individually and collectively, have acknowledged the need to adopt more sustainable pest management practices. Yet, while most of us can identify practices that will lead in that direction, current policies and regulatory frameworks often favour less sustainable approaches. Sustainable pest management requires the availability of alternatives to chemical pesticides, the excessive use of which is increasingly acknowledged to be unsustainable.

Current practices commonly overlook the potential ecological, social and human health consequences of pest management strategies when examining the economic costs and benefits. In fact, very few comprehensive studies have been undertaken on social and environmental costs of current chemical pest control strategies. In addition, sustainable systems are dynamic in nature and therefore, the relative costs and benefits should be regularly reviewed.

Government policies should recognize the unique fit of biological control agents as viable alternatives that can be used as part of an integrated approach to pest management in sustainable pest management systems. Our experience with chemical pesticides has already shown us many important examples where both insects (Roush & Tabashnik, 1990; Metcalf, 1994) and weeds (Heap, 1997) have developed resistance to those pesticides. At the same time, many chemical pesticides are incompatible with biological control measures. Although pests might also develop resistance to biological control measures, this tends to occur more slowly than with chemicals and the opportunity exists to manage this in a sustainable way through an integrated approach.

Such an integrated approach also relies on developing a better understanding of the impact and role of transgenic organisms. Applications of recent molecular biology techniques and biotechnology can successfully complement biological control strategies for sustainable pest management. Understanding the chemistry and physiology underlying the actions of biological control agents will permit isolation of the responsible genes. This knowledge could be applied in two directions. First, new agents with enhanced biological control ability can be produced by genetic transformation. Second, the transfer and expression of these genes into crop plants may directly render them with similar biological control capacities as the original biological control agents. The parallel (or interchanging) application of these approaches in the practice may decrease the probability that pathogens or pests develop resistance. Finally, such an integrated approach might be mutually beneficial for both the biological control industry as well as the biotechnology industry

Throughout the OECD countries there are already efforts underway to move toward more sustainable practices, such as Integrated Pest Management (IPM) or organic farming. Ultimately, neither of these approaches may be sustainable, so long as they fail to incorporate technologically advanced biological control systems or include those chemical pesticides that also mitigate against sustainable biological systems. Therefore, countries should seek to implement measures that encourage phasing out of non-sustainable technologies. Such measures might include financial incentives or regulatory policies for the adoption of biological control (see Workshop report by Jensen).

HARMONIZATION

Recommendation

With limited resources, small profit margins and restricted markets for biological control agents, every effort should be made to facilitate registration of these products. One way of doing this is through global harmonization of appropriate regulatory requirements. Member countries should enhance their co-operative efforts to harmonize and streamline their regulatory frameworks and policies for biological pest control by ensuring that:

- Uniform data requirements are used for registration, including specific data requirements for each biological control agent (distinguishing between indigenous, exotic and genetically-modified);
- Uniform and adequate protocols are adopted for the containment of organisms during testing, prior to their release as biological control agents (see Hoy *et al.*, 1997);
- Databases are accessible to member countries to minimize the costs of

registration of safe biological control agents.

Rationale

OECD member countries have strong ties, politically, economically and, in many cases, geographically. Many of us share common borders and we trade extensively in agricultural commodities. As a consequence of this agricultural trade, there is a need to provide consumers in all OECD countries with assurances that imported products are safe and of comparable quality to those products produced domestically. Sometimes the production by neighbouring countries takes place within a few kilometres of each other. Nevertheless, both food safety and quality may be strongly impacted by pest management practices in the producing/exporting countries and consumers expect their regulatory agencies to buffer them against the potentially negative impacts of imported products. At the same time, the close proximity of production often means that we share the environmental impacts of our neighbour's actions.

The OECD Pesticide Programme under the direction of the Pesticide Forum, is one of the activities already being undertaken to facilitate access by member countries to the safest and most modern pest management tools. This involves numerous harmonization efforts including the recent workshop to develop Common Core Data Requirements for Microbial Pest Control Products (Washington, D.C., August 19-20, 1998). Nevertheless, with respect to biological controls, there is a need to acceleratethis process; one which is often thwarted by a lack of adequate scientific information to support the issues that need to be resolved.

CO-OPERATION AND INFORMATION EXCHANGE

Recommendation

Member countries should promote and facilitate co-operation between all the parties concerned both nationally and internationally to meet societal needs for sustainable pest management. This should include the establishment of databases that are accessible to member countries on taxonomy, biosafety, safety management and follow-up on organism release. Where necessary to protect proprietary information, these data would be available to regulatory agencies only.

Rationale

The OECD has already acknowledged that co-operation between countries is key to the scientific and technical aspects of economic development as demonstrated by the Co-operative Research Programme: Biological Resource Management for Sustainable Agricultural Systems. As the requirement for scientific knowledge grows, this kind of co-operation becomes increasingly important. Thus, while the current phase of the Co-operative Research Programme is scheduled to end in 1999, the participants recognize the critical need for this to continue. This recommendation is intended to go beyond inter-country co-operation, however, to involve the participation of various stakeholders within each of the member countries.

Within countries, it is important that scientists have more opportunities to work together as inter-agency and interdisciplinary teams, to share information easily and reduce costs through collaboration. The concept of Centres of Excellence is one approach that is being taken to address this concern (see Workshop reports by Blum and Dupont). The need goes beyond science, however. Mechanisms should also be established and supported to ensure co-operation between all stakeholders, including consumers, farmers, pest control producers, regulators and scientists.

EDUCATION, COMMUNICATION, PUBLIC CONFIDENCE

Recommendation

Governments should facilitate the participation by all stakeholders in ensuring that biological control is properly

understood, promoted and implemented.

Rationale

This issue is underpinned by the recommendation calling for stronger co-operation. Information flow, common understanding and heightened confidence among all stakeholders will be facilitated by strong co-operative mechanisms. Developing appropriate information and utilizing those co-operative mechanisms to share that information is an activity that requires appropriate support and management by governments.

Governments recognize that in the context of ensuring an appropriate food supply, environmental health and public safety are key concerns. For this reason, regulatory authorities must have access to good science to develop appropriate guidelines. However, scientific knowledge combined with appropriate, harmonized legislation are not enough to ensure that sustainable agricultural systems will be put in place. Consumers may appreciate the concepts of a healthy environment and sustainable agricultural systems, but they may not fully understand what they should ask the marketplace to provide in order to move toward those goals. Clearly, if consumer demand is not focussed on sustainable systems, then agricultural producers will respond to the demand that exists. At the same time, developers of pest control products will provide those commodities that the agricultural community demands. Consequently, it is necessary for governments to provide incentives for sustainable systems in addition to ensuring good regulations for the registration of biological control products.

Appropriate extension systems must also be supported. Experience of FAO and other groups, have shown that farmer practices can be altered on a sustainable basis, resulting in adoption of IPM practices that include biological control techniques, through a process of intensive demonstration and farmer empowerment that results in farmers understanding agro-ecological principles. The process, known as ☮Farmer Field Schools■ is widely used across the developing world and could be adopted in OECD countries (Jones, 1996).

FUNDING FOR BIOLOGICAL CONTROL

Recommendation

Governments should ensure that adequate funding is available to establish and maintain core competencies in such areas as taxonomy and ecology, as well as the databases and links necessary for research and implementation of biological control. Moreover, governments should ensure that sustainability is a key criterion for application of public-good funding for pest management.

Rationale

While countries around the world have been reaching consensus on long-term environmental issues such as biodiversity, rain forest destruction, and other matters relating to sustainable agricultural systems, they have been adopting fiscal measures that have reduced the funding to agricultural R&D. This is occuring, at a time when the number of alien introductions is rising steeply worldwide, due to increased trade and communication between continents. As a consequence, our ability to develop and maintain biological control systems that are sustainable is being squeezed from both directions.

Only by increasing our knowledge about specific interactions in nature, will we be able to move to sustainable systems in the long-term. However, inadequate resources in the key areas of taxonomy and ecology, which provide the baseline data for understanding those interactions (see Workshop report by Hopper), means that our ability to develop low-cost sustainable systems is at risk. While the success of biological control projects is hinged upon good taxonomy, both of the host and the control agent, supported by Adatabase collections@ assessed in herbaria and museums, matching agent to target pest (e.g., Sands & Scholtz, 1985), its safe and sustainable implementation relies upon follow-up monitoring in the field.

Consequently, there must be provision for adequate numbers of extension specialists in the field, gathering and sharing scientific data.

The recent trend in scientific research has been for governments to facilitate the involvement of industry to ensure that research is targeted to identified needs, so that new technologies will be marketable. As industries are becoming more involved, particularly in short-term projects, governments are reducing their support. However, very few industries are prepared to target market opportunities that are several decades in the future; opportunities that may be small by virtue of the sustainable nature of the products. The marketplace is geared to products yielding short-term gains. Therefore, as society becomes more environmentally conscious and as governments promote the use of sustainable agricultural systems, they should ensure that the necessary technologies are available to meet the anticipated demand.

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