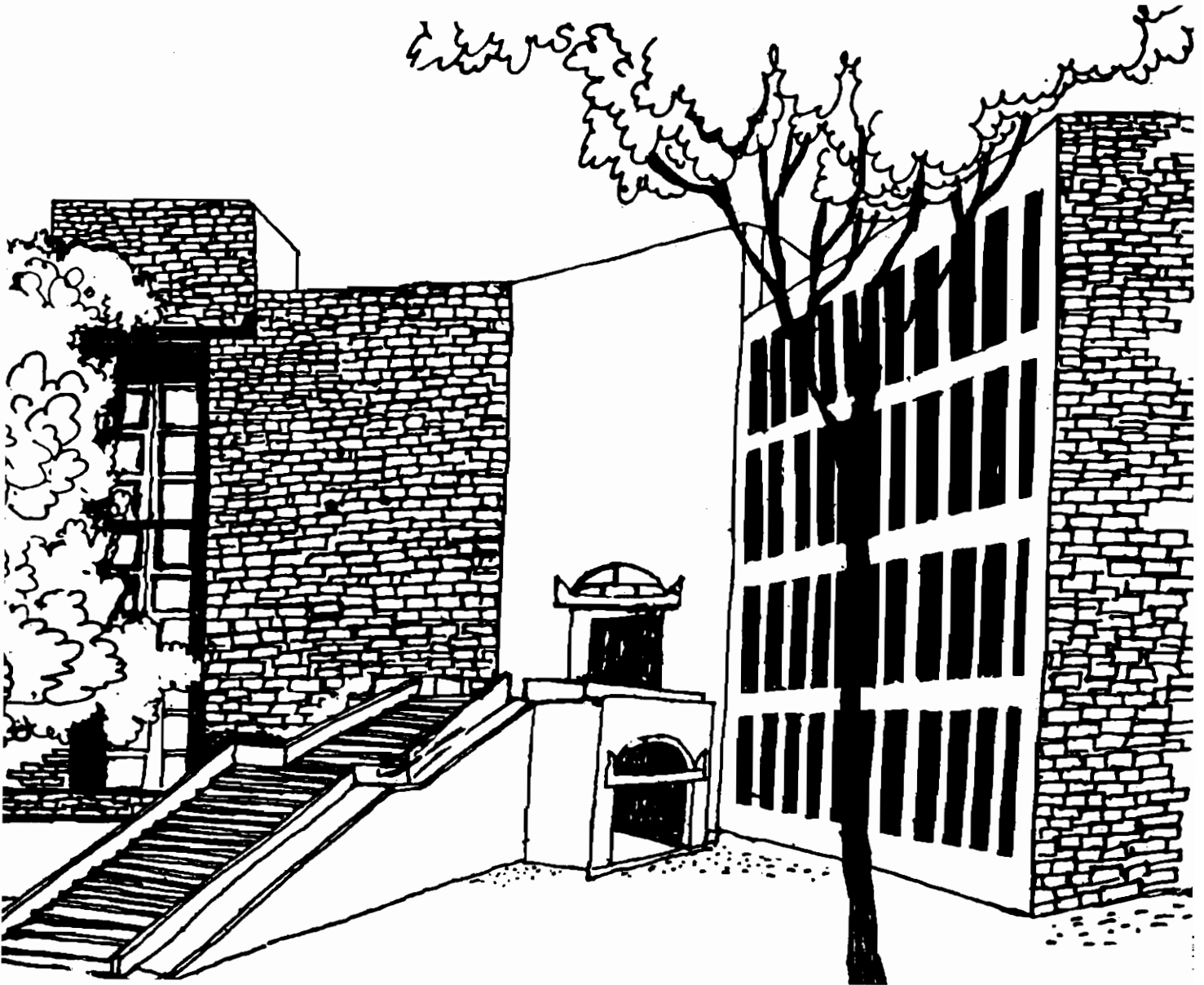




Working Paper



CONSERVING DIVERSITY FOR SUSTAINABLE
DEVELOPMENT: THE CASE OF PLANTS OF
INSECTICIDAL AND VETERINARY MEDICINE
IMPORTANCE

By

Anil K. Gupta
Kirit Patel

&

B. L. Patil

W P No. 1003
January 1992

The main objective of the working paper series of the IIMA is to help faculty members to test out their research findings at the pre-publication stage.

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380 015
INDIA

PURCHASED
APPROVAL
GRATIS/EXCHANGE
PRICE
ACC NO.
VIKRAM SARABHAI LIBRARY
I. I. M., AHMEDABAD.

**Conserving Diversity for Sustainable Development:
The Case of Plants of Insecticidal and Veterinary Medicine Importance**

**Anil K Gupta
Kirit Patel and B L Patil**

1991

**Centre For Management in Agriculture
Indian Institute of Management.
Ahmedabad-380015**

Conserving Diversity for Sustainable Development: The Case of Plants of Insecticidal and Veterinary Medicine Importance

Abstract

The debate on north-south relations, sustainable development and maintenance of biodiversity has assumed renewed seriousness in the light of current controversy on intellectual property rights. While the right of the nations have been taken into account, rights of the poor people who have produced or maintained much of the ecological knowledge have not been adequately acknowledged.

The paper provides list of several hundred plants which have been used for veterinary medicine or plant protection purposes by the local people in India and elsewhere. Our continuing work on documentation of local technical innovations and ecological knowledge systems indicates considerable potential for building upon peoples' knowledge for developing sustainable technologies.

We recognize the need for cataloguing this knowledge more systematically so that inter-disciplinary screening can take place for extending in some cases the frontier of science. Institutional arrangements will need to be made so that the producers and preservers of this knowledge are not denied fair returns from the local resource or a local practice when it is commercialized. We also argue that the descriptors of germplasm used in various gene banks need to be modified to acknowledge and catalogue the cultural and ecological knowledge of the people associated with a given local crop variety or an animal breed. It is also hoped that systematic research on plant-derived pesticides might help in reducing and in due course eliminating the hazardous chemical pesticides. A strong case is made for redefining the framework for conservation of bio-diversity so that stakes and insights of local people become the basic building block of future developmental strategies and interventions.

First Draft

Conserving Diversity for Sustainable Development:¹

The Case of Plants of Insecticidal and Veterinary Medicine Importance

The preponderance of mountain ranges and the rain forests between 20 - 40 degree latitude around equator provides ideal historical niches for most of the genetic diversity to evolve. The tragedy is that these tropical environments also happen to have some of the most poor people (Swaminathan, 1973, Fowler and Mooney, 1990, Gupta, 1990, 1991). The relationship between diversity and deprivation is not just a case of ecological determinism. It is a direct consequence of the way we have priced the knowledge people have evolved to survive in a given cultural and institutional context. The rituals, recipes and respect for nature were woven together in a survival ethic for a long time.

This ethic is becoming weaker because it no more helps in surviving reasonably. The demand for this knowledge is also not increasing at the pace that the markets or public institutions may intervene and safeguard the ecological and genetic knowledge system of the people in the high risk environments. However, the farmers in high growth regions are at long last recognising that the high chemical input intensive agriculture is not sustainable. And their own knowledge tree had nearly dried out decades ago when the non sustainable path was chosen (perhaps inevita-

¹ This paper is prepared by Anil K Gupta (Professor), Kirit Patel and B L Patil (Research Associates) , Centre For Management in Agriculture, Indian Institute of Management, Ahmedabad. The responsibility for any errors that remain rests solely with the first author. This paper is a preliminary draft and may contain some mistakes in the description of scientific information of the plants, pests and control measures. I will appreciate if the draft is used with these limitations and mistakes are brought to my notice. I also request the readers to kindly send other references on the subject so that the scope of this review is expanded

The paper is an invited contribution for the Project Design Workshop on Genetic Resources For Sustainable Agriculture, M S Swaminathan Research Foundation, Madras, Nov 22-23, 1991

ble in the given political and economic circumstances, as some would say²). There exists an opportunity for building viable links or bridges between the Indigenous Genetic and Ecological Knowledge System and the freely felt need for sustainable technologies. In poor growth regions also, the inability of market forces to deliver the so called modern means of improving productivity either because of low demand or poor infrastructure or just non availability of suitable technologies requires that local knowledge system is recognized and rejuvenated.

In this paper, we provide evidence from our own survey of farmers' technical innovations and knowledge systems and limited review of literature related to the plants of insecticidal and veterinary medicine importance. The information provided here is partial and thus limited in its coverage. We have yet to get several plants identified which are used for the purpose in Gujarat. The idea is to focus attention on the technological, institutional, ethical and cultural aspects of indigenous ecological (and genetic) knowledge systems (IEKS) in specific context of the plants of pesticidal importance.

In part one we discuss the framework of sustainability as related to genetic diversity. In part two we deal with the insights emerging from our survey of IEKS. In part three the issues related to documentation and use of the people's knowledge are summarized. Finally the implications for global and national strategy for Germ Plasm Banks and conservation projects are drawn.

2 Recently during a meeting with a young couple practicing organic agriculture in Denmark, this issue was brought out most succinctly. When I asked as to whom did they consult when they got in to problems, they said while support service did exist provided by the organization of the organic producers, they often had to consult old agricultural books used by their parents. Recent literature did not deal with their problems adequately. Their network also had not become as stronger in terms of the research. It appears that this is an area where the thriving indigenous knowledge tradition of the developing countries particularly in the case of the animals may help provide solutions to the problems of developed world.

While reviewing old books published in pre-independence period about agriculture or soon after, I have noticed that most of these books dealt with both the knowledge systems- the traditional and the 'modern' of that time. However, it is in the post-independence era that the publications have ignored the farmers' knowledge systematically.

Part-One

Sustainability through Diversity without Deprivation

Several recent documents have outlined the goals and objectives of global strategy for sustainable development with respect to biodiversity. For instance, Caring For the Earth (IUCN), Global Biodiversity Strategy (Sept, 1991, World Resources Institute, IUCN, UNEP), Revised Draft Convention on Biological Diversity (Ad Hoc Working Group on Legal and Technical Experts on Biological Diversity, Madrid, July, 1991, UNEP), Rights of Future Generations, Rights of Nature (Studies from the world alliances of reformed Churches, Geneva, 1990), Final Consensus Report Of The Keystone International Dialogue Series on Plant Genetic Resources (Madras Plenary Session, Feb 1990) etc. Most of these statements involve making an assumption that conservation and development in the given framework can be harmonised without making any fundamental change in the mode of governance or institutional relationships between the deprived people, state and the beneficiaries of the current non sustainable technologies. It is argued often normatively that we should bequeath same amount of genetic diversity that we were endowed with. At the same time we advise market based model of development which with present institutions is often unable to provide for long time horizon.

The rights of the unborn can be exercised if they are born. But given the economic squeeze in most of the developing countries often because of wrong domestic policies as well as unfavourable global environment, one is not sure how many poor children if born would cross their childhood. The diversity is linked with the aspirations of the families who suffer such uncertainties.

We therefore define sustainability as a process which while expanding the decision making horizon of the poor also extends their time frame. This will imply constriction of the choices of those who have got used to a eco-destructive life style. The institutional assurances would have to be provided to people who will use resource conserving technologies. Their access to alternative resources, abilities or skills to use new resources or use existing resources more efficiently and assurances about future return from present investments and collective behaviour would need to be organized (Gupta, 1981, 1987). In case of plants of pesticidal importance, the access to common lands and forests would make an important difference to the future survival and furtherance of this knowledge.

The linkage between various developmental policies and conservation strategies will also need to be forged. The macro policies towards chemical pesticides for instance if continue to be dominated by Multi National Corporations and other vested interests, then one can hardly hope for any support for alternative technologies. Under such circumstances the information like the one provided in this paper will be discounted, tried through inappropriate heuristics and condemned without fair trial. The case of herbal insecticide 'Indiara' developed by a Pune based entrepreneur Sukhatme is a good case in point. Despite the fact the market is supporting the technology and product and its efficacy has been proved by thousand of farmers and various international companies or institutions (which have tried or are trying this product), the product does not get a fair deal by the concerned authorities.

Indonesia, incidentally, banned 57 pesticides with only 10 pesticides allowed to be used. same crop yield was obtained in 1987 with almost half as much insecticides. BORIF(Bogor Research Institute for Food Crops) reported that the population of a serious rice pest viz: Brown plant hopper also came down. In Philippines after finding that neem was very effective against *Hyterocypris Luzonensis*, 40,000 ha were planted under Neem. And in India we still seem to be waiting for catastrophe before we modify our policy and institutional environment. It is all the more regrettable because India perhaps has one of the most competent scientific workforce in this regard. If not one botanical has been commercialized so far, it can only indicate that competence is not enough.

There are many other technologies which farmers are using at small scale and may continue to use in a localised manner without other people affected by the same problem ever becoming aware about these. Such a system of information collection and dissemination is obviously non sustainable.

The sustainable development approach would require that the knowledge production system, reproduction, validation and peer approval system, testing and dissemination system and recognition and reward systems are looked in their historical and cultural context. Most of the sustainable technologies are group based where as most of extension approaches are individual based.

It should be noted that farmers may sometimes do the right things for wrong reasons. It is necessary that the rational aspects of the technology are distinguished from the causal model and cultural setting of the practices.

Part Two

Plants of Insecticidal Importance: why should we study them?

The interest in this subject has been there among the scientists for a very long time. The botanicals are a recognised field of research and action. The Central Tobacco Research Institute had brought out some years ago an excellent document on the subject (See annexure 8 for the summary of the plants identified in their review). We have been surveying the villages of Gujarat with the help of the students of rural Vidyapeeth (colleges) and already documented about 500 innovative practices in addition to the ones reported by the members of our Honey Bee Network³.

We have listed 20 plants identified during recent survey in Annexure-1 and 7 plants in Annexure-2 with some very creative arrangements of pest control. One very innovative example of group action was narrated by Vasava Rupaji Bhai Of vagalkhor village in Bharuch district. Several farmers collect the leaves of ~~Fegonia exotica~~ ^{Combretum ovalifolium} and put these in a bag on their shoulder. They walk in a direction looking at the wind direction and catch some insects from the air (probably blister beetle). The insects are crushed along with some leaves in the hand and with palms open , the group moves along from one side of the village to the another. The smell of the crushed insect and the leaves apparently drives the pests away.

The hydrocyanides in younger plants of sorghum have been used in another region to control termite infestation. The cut plants are put in an irrigation channel so that the toxic chemical are slowly mixed with the water and dispersed

-
3. The Honey Bee is an informal news letter started two years ago to network the farmers, artisans, pastoralists, fishermen and women etc., to document the creativity and experimentation at grass roots level. It is hoped that the scientists members of this network would initiate experiments on the same to identify the scientific basis underlying the farmers' innovations. This news letter is being brought out in four Indian languages viz: Hindi, Tamil, Gujarati and Oriya. Colleagues in South Africa and Guatemala are also trying to initiate similar network. Letters of interest have been received from a large number of countries including Bangladesh, Sri Lanka, Zambia, Nigeria etc. We request readers interested in joining the network to write to us.

in the fields. The toxic effect on animals if they ate young sorghum was known to people. To use this toxicity for pest control would have required some research and development by the innovative farmers. How to preserve this knowledge? Whether the knowledge which can be used without generating profits for market would be diffused by the public and other institutions?

In Annexure-2 and 3 several more examples are given. Few of these examples interestingly were tried in America also in 1907 as published in a book entitled, "Fortunes in Formulas for Home, farm and Workshop," by G D Hiscox and Prof. T. O'Connor Sloane (Books Inc, New York, 1907, revised edition 1945). Use of Pyrethrum, neem, soap solution of various kinds and other plant derivatives mixed with various additives have been used with varying effectiveness against numerous plants.

Thirty one plants listed in Annexure-3 have been drawn from an annotated bibliography compiled by us last year on "Peasant innovations for Sustainable Development" (Gupta, Capoor and Shah, 1990). Different parts of the plant have been used in various preparations.

It may be useful to note here that many times when the scientists fail to validate the farmers' knowledge and innovation, it is not always because the innovation is ineffective. Often the framework of testing and protocol of validation may be inappropriate. This problem was recognised by Dr. Wit in his report entitled, "Alternative Medicine In The Netherlands. Summary of The Report Of The commission For Alternative Systems of Medicine , The Hague, 1981" reproduced in a Report on " Alternative Therapy" prepared by The Board of Science and Education, England, British Medical Association, 1986. The quality of sample is an important issue. Same plant collected from different soils, at different stages and even time of the day does not have the same metabolic properties.

Farnsworth (1986)⁴ in a seminal contribution on " Screening Plants for New Medicines" (in Biodiversity, Ed. E O Wilson , Washington: National Academy Press) demonstrates that out of 114 plant derived drugs, in as many as

4. DR Farnsworth has offered us the access to his data base of over 35000 plant species. We hope to link with this data base soon so that we do not end up rediscovering the wheel.

seventy percent cases the drug was used for the same purpose for which native people had discovered the use. The causal link between a problem and its answer had been established by the people. What scientists did was either to synthesize an analog or make the process of extraction more efficient and cost effective (in the short term). Could not a similar relationship exist between farmers' knowledge and the modern derivatives? Will India and other developing countries give this strategic issue an attention it deserves? Will the people who discovered this knowledge get any share out of the income that may accrue by improving the process originally discovered by them? Will the debate on intellectual property rights be guided not by just recognising the farmers' rights but also providing them some return? It should be noted that the farmers' knowledge is not a stagnant pool. It is river of knowledge in which new streams of thought, action and materials keep meeting. One can not preserve this knowledge by delinking it with the cultural and institutional context.

The descriptors used by various gene banks will have to be reconceptualised. Otherwise lots of knowledge will lie unutilized because of improper cataloguing.

Several examples have been given Annexure-4 of the plants used for veterinary medicine derived from a bibliography compiled by Mathias-Mundy and McCorkle (1989). It may not be without significance to mention that perhaps first of the two post graduate theses on indigenous animal husbandry practices were guided by Dr Y P Singh then at PAU, Hisar. Many plants of veterinary medicinal importance were identified in the theses pursued by Verma and Khanna. Apparently one of the scientists got award for developing a drug based on the plant locally known as Khartumba. Of course no recognition and compensation followed to the pastoralist on whose knowledge the theses were based and the students and their guide who pursued the research.

In Annexure-5 we have listed about 280 plants which have been noted in this review in about 306 references on plants of pesticidal importance. In Annexure 6 we have listed the name of the pests and the number of plants (n=210) used for controlling each.

Certain pests have attracted apparently greater variety of plants than others. In case of crops (the list for animals is given in annex 7), with all the limitations of our data base, we note that *Callosobruchus chinensis* (southern cowpea weevil) was sought to be controlled by 45 different plant species followed by *Spodoptera litura* (n=24), *Tribolium castaneum* (n=11) etc. In annexure -8, we have listed all the plants of insecticidal importance identified in a review by Central Tobacco Research Institute, ICAR. The references are available in the original publication as well as with us and can be supplied on request.

In Annexure-9, list of plant used for allopathic interactions for pest control derived from Riote's excellent book on "Carrot Loves Tomatoes" (vermont: Storey Communications, 1989). In annexure-10, part-a and part-b include plants used in veterinary medicine collected from two sources. A detailed list is available in two post graduate thesis done by Verma and Khanna guided by Dr. Y P Singh (presently, professor, Division of Extension, IARI, PUSA, New Delhi-12) in 1967. These are to the best of our knowledge earliest post graduate thesis on indigenous knowledge of peasants and pastoralists. It is a different matter that reference to these would not be found in most western publications on the subject⁵.

While above data will need to be reanalysed, several questions need to be answered:

- a) Are there certain kind of pest families or complexes which respond to low toxicity botanicals better?
- b) Whether there exist a variety in the pests complex which require different botanicals in different regions, at various stages of plant growth, with different degree of infestation, or at different nutrient levels⁶?
- c) Whether the host-parasite interactions have defined the range of innovations developed by the people which are spatially circumscribed? Or can some of the measures be generalised and if yes, which one and in what combination and for which pests?

5. Verma M R and Y P Singh. A Plea for Studies in Traditional Animal Husbandary. The Allahabad Farmer, March 1969 XLIII(2)94-98.

Verma M R, Dairy Husbandary of Nomadic Gujjars in Six South-East Himachal Forest Ranges. M Sc Thesis submitted to Punjab Agri. University, 1967

Khanna B M, A Study of Indigenous Systems of Veterinary Medicine as Practiced by Farmers of Hissar I Block, MSc Thesis submitted to Punjab Agri. University, 1967

6. Studies have been reported in the recent issue of Acres: a journal of ecological agriculture (August, 1991) that a strong relationship exists between sugar levels in the plant affected by the nutrient levels and the vulnerability to pests or other stresses.

- d) Whether farmers' perception of damage by certain pests has been such that no special control measures were considered necessary? At what degree of infestation will what combination of measures be effective?
- e) Whether certain treatments actually do not control but only provide relief from secondary infections in case of animals?
- f) Are there certain kinds of compounds which can provide clues for searching new plants with pesticidal property?

Part-3

Institutional Arrangements:

It is obvious that the conservation strategy for genetic variety would depend upon the way we conceptualise the relationship between survival strategies of people and the institutional arrangements.

It may be useful to look at the following issues:

- a) Whether the knowledge of certain plants is linked with the knowledge of ecological system itself and thus should one try to begin with the description of the ecological knowledge system?
- b) Is it necessary to use very elaborate methods for initial documentation? We have not used any questionnaire and we certainly feel the current fad of RRA is totally useless. There is no need to demean the spirit of social enquiry by using so called rapid methods. Simple survey but informally through rural youth properly explained the purpose of enquiry will suffice.
- c) The acknowledgement of the contribution by the farmers and the persons through whom the data is collected is most vital. Not only that, the information after compilation should be shared with the providers of the data in local language?
- d) Any rent or reward obtained for this documentation should be shared with the people in some or other way.

e) Citations should be given to the people by name in various scientific papers based on the research on the people's knowledge.

f) The cultural context of the knowledge system should be documented along with the technological information where ever possible or feasible.

g) The capacity of people to do their own research should be enhanced so that they can also add value to their own knowledge.

Summing Up

The conservation of genetic diversity is an issue of urgent importance. The public policies for less developed arid, hill, forests, flood prone regions etc., are very weak. Outmigration of men leave women with the major responsibility of managing household among poor families for part or whole year. Their knowledge system will of course be influenced by the limitations of the functions, role and social and cultural boundaries. But their knowledge is of immense importance in certain functions such as seed collection, selection and preservation.

The documentation of varietal characteristics through descriptors used by various gene banks need to be strengthened. The descriptors need to be modified. The cultural and ecological knowledge in which technical knowledge is embedded should be given due place in describing genetic wealth. It does not have to be mentioned that system of classification of books in library has an important bearing on the way the books are utilised. We need to include more collections, organize them in situ with the help of the people and through their own organizations and periodically update the descriptions of the existing lines.

The scientific studies of the kind reported here can be very useful if biological scientists can use simple social science perspectives and enrich their understanding of the IEKS.

We can not preserve the IEKS if we don take a position on the every developmental paradigm. Within the given framework also, scope remains for the viable links to be established between the IEKS of the people and formal R

& D.

India and other developing countries can turn the tables if they can recognize the worth of the knowledge systems of their own disadvantaged people. Will we recognize this potential? Will the stronghold of big chemical pesticide companies many of which are taking over the seed and other agro-chemical companies allow an alternative decentralised low external input model of plant protection and growth set roots? I think, the answer lies in the scientific rigour with which the people's knowledge is built upon for developing alternative technologies⁷.

VIKRAM SARABHAI LIBRARY
INDIAN INSTITUTE OF MANAGEMENT
VASIRAPUR, AHMEDABAD-380015

-
7. A Report Of Board Of Science And Education on Alternative Therapy. (British Medical association, U K ,1986) had looked at the alternative systems of medicine on the advice of Prince Charles. In the annexure to this report was provided a report by commission For Alternative Systems of Medicine, Ministry of Health and Environmental Protection, Netherlands. This report observed, "It is important to realise that there are two essentially different approaches in research: one based on the nearest higher system level, which places phenomenon in their context and seeks explanations and purposes, and one based on the nearest lower level, which is concerned with discovering how things work , the mechanisms behind them. The first approach may be termed contextual, and the second analytical..."

There may be a need for similar care in screening plants for pesticidal importance. The sampling of plants will need to be done carefully(from where, at what time of the day and the year, which part, any allelopathic requirement i.e. should a plant be collected only when found near a particular plant, etc.). Since sampling would require close involvement of people, it is necessary that their rights are protected. Why should otherwise the poor people share their last territory i.e. the knowledge domain?

ANNEXURE 1
PLANTS OF INSECTICIDAL IMPORTANCE

Source: Survey on Farmers' Innovation and Knowledge System (1990-91)
Anil K. Gupta, Indian Institute of Management, Ahmedabad, 1991.

1	2	3	4	5	6	7	8
Name of Plant	Name of pest and symptoms	Useful part of plant and stage of growth	Formulation of active ingredients	Method of use and name of crop	Efficiency and precaution	Area and extent of adoption	Source
1. <i>Megarranda fistylosa</i> (Waffatiya)	Reddish coloured larvae of insect pest which cause damage to leaves and flowers.	Upper leaves of the plant along with tender stem, (young upper branches)	Upper branches of plant having 20.25 cm length is collected and boiled in 2-3 litres water. Filtered decoction is used as insecticide.	Filter decoction is mixed with water in proportion of 1:5 and sprinkled over the pigeon pea.	Approximately 750 success can be achieved	About 500 farmers, only because it requires too much labour.	Thakorbbhai Kesurbbhai Patel Vill: Sedhi, Tal: Pedra Dist. Vadodara Coma: Chauhan V.A.
2. <i>Ipomea</i>	Aphid and larvae of insect pest damage the leaves, flower and pod of pigeon pea.	Green leaves of plant	Approximately 1.5 - 2.0 kg. green leaves are boiled in the water (8-10 litres) till the volume becomes half. Resultant extract is filtered through cotton cloth.	Filtered extract is mixed with water in the spraying pump @ 300 ml./15 litres and sprinkled over the pigeon pea.	It gives satisfactory result (about 70-80%) even if no chemical insecticide is effective.	About 750 farmers. This area has intensive agri-culture and good irrigation facility sometime they are spraying insecticide by bell spray on cooperative basis.	Ahmedbhai D. Ganchi Vill: Peshad Tal: Valla Dist. Bharuch Coma: Kirit K. Patel
3. <i>Simta</i>	Larval insect pest damage to leaves, maine.	Fruit	Approximately 2.0-3.0 kg. fruits are collected and cut in small water (10-12 lit) and filtered through cotton cloth.	Filtered suspension is directly sprayed with the help of small branches of tree or boom.	More than 800 farmers are using forest area and people are economically very poor and illiterate.		Chamchhiyalebhai Jeealabbhai Vasava Vill: Mohbi Tal: Padipada Dist. Bharuch Coma: Kirit K. Patel
4. 'Dhuma' <i>Conocretum ovalifolium</i>	Insects like blister beetle in bajra crop.	Leaves	2-3 leaves of this plant crushed in the palm along with 1-2 insects. This mixture releases peculiar smell.	About 5-6 people of wind in row. They practice this procedure continuously with fresh leaves from bag at an interval of 2-3 min.	Very few farmers are using on cooperative basis. This area is have some irrigation facility However, economic condition is medium to poor.		Vasava Rupajibhai Kalibhai Vill: Vagelkhor Tal: Valla Dist. Bharuch Coma: Shri Pandyabhai School, Vill: Thava Tal: Valla Dist: Bharuch

1	2	3	4	5	6	7	8
Name of Plant	Name of pest and symptoms	Useful part of plant and stage of growth	Formulation of active ingredients	Method of use and name of crop	Efficiency and precaution	Area and extent of adoption	Source
5. <i>Castor Ricinus communis</i>	Termites Aphid	a) Castor Oil growing of castor. b) Castor Cake, castor.		a) Castor oil is poured on the stem of ber tree/plant. the infestation in next year. b) Castor cake is applied in the opened furrow before sowing. c) Castor is grown in problem of termite (crop rotation) d) Sometimes castor oil is added in the irrigation channel during irrigation.	Growing of castor in field reduces the infestation in next year.		a) Bhadbbhai Tribhuvandas Patel Vill: Chandrasan Tal: Chanasama Dist: Mahesana Comm: Anil S. Patel b) Taleji S. Nava Vill: Dethali, Tal: Thared Dist: Banaskantha Comm: Kirit K. Patel c) Maljibhai R. Patel Vill: Bhornad Tal: Bhangedera Dist. Surendranagar Comm: Kirit K. Patel
6. <i>Sorghum bicolor</i> (Sorghum)	Termites	Immature plant (30-40 days old)		Cut plants are placed in the water channel during irrigation.	-	Dry region. Irrigation facility is limited.	Karanbhai K. Desai Vill: Malepur, Tal: Thared Dist. Banaskantha Comm: Manjit V. Thako Dudhaji D. Thakor Vill: Nava Tal: Mali Dist: Surendranagar Comm: R.S. Prejapathi
7. <i>Calotropis gigantea</i> (Calotropis)	Aphid	Leaves	Fresh leaves are collected	Leaves are immersed in water channel during irrigation to minimise the aphid infestation in mustard.	-	Dry region. Very limited facility of irrigation	
8. <i>Aristolochia bracteata</i> (Kidamari)	Rat	Earhead	Cake of groundnut seed and flour of Kidamari's ear head is prepared.	Cake is placed near the entrance of rat burrow.	-	Semi arid region	Karanbhai K. Patel Vill: Jasepar, Tal: Mali, Dist. S. B Comm: Marimbhai S.
9. <i>Leucas verticillifolia</i> (Kubo)	Pest of storage	Earhead	Earheads are collected.	Earheads are incorporated with grains during storage.	-	Semi arid region	Manubhai B. Patel Vill: Bole, Tal: Dhan Dist. Ahmedabad Comm: Balvrat Rat

1	2	3	4	5	6	7	8
Name of Plant	Name of pest and symptoms	Useful part of plant and stage of growth	Formulation of active ingredients	Method of use and name of crop	Efficiency and precaution	Area and extent of adoption	Source
10. <i>Calotropis gigantea</i> (<i>Calotropis</i>)	b) Katra (local name of larvae) of insect pest	Leaves	Leaves and branches are collected.	b) Leaves are broadcasted in the infested field. Larvae of insect pest migrate to leaves, thereafter leaves are collected and destroyed.		Irrigated area, most of farmers follow multiple cropping and advance technology.	Vill: Soja, Tal: Vijapur Dist. Mahesana Comm: Ranjit M. Rathod
11. <i>Datura</i> (<i>Ocimum basilicum</i>)	c) Talkidi (local name of insect pest)	Branches		c) Cut branches are placed in the water channel during irrigation.		Semi arid region. Limited facility for irrigation.	Vill: Bar, Dist. Rajkot Comm: U.K. Rajabhai
12. <i>Euphorbia</i> (<i>Spp.</i>)	Chitri disease in tobacco	Plant	Plant are grown around the tobacco field.			Moderate rainfall. Good irrigation facility. Intensive agriculture.	Farmer D. Bhulsinh Vill: Choyaa Muvada Tal: Savali, Dist. Baroda Comm: Matversingh B. G.
13. Tobacco (<i>Nicotiana glauca</i>)	Larvae and insect pest	Leaves	Leaves are collected from the field.	Leaves are placed around the nursery bed of tobacco. Larvae of insect pest migrate to these leaves. Leaves are collected along with larvae and destroyed.		Irrigated area, good irrigation facility. Intensive cropping system.	Chhagambhai M. Chhaban Vill: Rajapura Tal: Savli Dist. Baroda Comm: F.B. Gohil
13. Tobacco (<i>Nicotiana glauca</i>)	Insect pest of cotton and pigeon pea.	Leaves	Dried leaves of tobacco (500 gm) are boiled in the water (5 ltrs) till its volume reduces into half. Decoction is filtered out and used as insecticide sometime copper sulphate powder is also mixed with it.	Approximately 200-250 g. boiled extract is mixed with 15 litres of water and sprayed over cotton crop. Sometime it is used for pigeons crop.	According to users, about 75% success can be achieved in controlling pest if copper sulfate mixed and extract is prepared properly.	Irrigated area. Intensive cropping. Sometime they follow serial spray on co-operative basis.	K.M. Vasandiya Vill: Tuna, Tal: Vaila Dist. Bharuch Comm: Kirit K. Patel

1	2	3	4	5	6	7	8
Name of Plant	Name of pest and symptoms	Useful part of plant and stage of growth	Formulation of active ingredients	Method of use and name of crop	Efficiency and precaution	Area and extent of adoption	Source
14. Arni Clerodendron multiflorum	Aphid and other sucking pest in cotton, pigeonpea, green gram, soybean.	Growing primordia and young leaves.	Young leaves and growing primordia are collected and crushed. Crushed leaves are boiled in water, filtered decoction is used as insecticide.	Approximately 200gm water is mixed with water (15 litres) and sprinkled over the crop of cotton, pigeon pea, green soybean etc.	Very high.	Irrigated. Intensive agri.	C. U. Fajsheliya Vill: Marshad Tal: Valla Dist. Bharuch Comm: Kirit K. Patel
15. Anuchhadi			(Leaves of both the plant are mixed and used)				
16. Chilli Capsicum annuum	Pest of storage	Dry powder of chilli.	Red coloured ripen fruits are ground	Chilli powder is mixed with grains in storage.			Vill: Kulsar Tal: Surendranagar Dist. Surendrar Comm: Marsingh S. S.
17. Megli (Eleusine Coracoma)	Termites	Root	Root of Megli plant are pounded and boiled with crushed leaves of Maffetiya in water. Decoction is filtered through cotton cloth.	Filtered decoction is poured on the stem of plants affected by termites.			Fossilabhai Pandubhai Vill: Burpeda, Tal & Dist: Dang Comm: Matilal R. Ganvi
18. Sinara	Sukara disease of rice	Branches	Branches are collected.	Branches are planted in the field.			Marijibhai Gbedabhai Vill: Gbedisaal, Tal: Vasanda Dist. Valsad Comm: Matilal R. Ganvi
19. Phanas Artocarpus heterophyllus	-do-	-do-	-do-	-do-			-do-
20. Samar (Midea biferuata)	Insect pest of paddy.	-do-	-do-	Branches are placed in the field to avoid infestation.			Marsabhai B. Patel Vill: Baroliya Tal: Dharampura Dist. Valsad Comm: Shallesh M. Pat

ANNEXURE 2

PLANTS OF INSECTICIDAL IMPORTANCE

Source: Gaby Stoll, Botanicals and Adaptive Research, The Sustainable Agri. Newsletter, Aug, 1989, 1(4) 3-6

Name of Plant	Name of insect pest and stage	Method of use	Useful part of plant	Name of active ingredient	Concentration of insecticidal material	Effectiveness	Name of crop	Place of use.
1. <i>Asanona</i>	Aphid	a) Seed Oil	Seed		a) 10% concentration is most effective for <i>Urentius Echinus</i>	90% efficiency	-	-
<i>Synanassa</i>	Brown rice plant hopper							
<i>A. maritima</i>		b) Pulverised seeds are used in China and Philippines.	Seed		b) --	-	-	China & Philippines
<i>A. rotundifolia</i>	Diamondback moth, <i>Cryptanthus</i> aphid, Grasshoppers, Green bugs, Green rice leaf hopper, potato aphid, red pumpkin beetle, whitebanded rice plant hopper.	c) A water suspension for seeds in Africa. d) An extract of leaves with ether.	Seed Leaf		c) - d) -	- For red pumpkin beetle. 91% death rate.	-	Africa
2. <i>Capsicum frutescens</i>	Ants, Aphids, Caterpillars, Coleoptera, beetle, imported cabbage worm, rice weevil, war-house, pests, cucumber mosaic virus, cucumber ringspot virus, tobacco etch, TMV, Tobacco ringspot virus.	a) Hot chillipeppers are finely ground, stirred in water and allowed to stand overnight. After filtering, it is sprayed over the plant. b) Chillipepper is used as repellent. Mixture of ground chillies. Soap and water sprinkled over the affected plant. c) Chill spray preparation in Philippines. Chillies (100 g.) are pulverised in mortar and mixed with one litre water. One part of filtered suspension is diluted with five parts of soapy water before spraying.	Fruit Fruit Fruit		a) - b) - c) 100g. Chillies in 1 lit water and diluted in proportion 1:5 with soap water, to strong concentration causes burning of the leaves.	good result is reported on the control of aphid.	-	Papua New Guinea Philippines

Name of Plant	Name of insect pest and stage	Method of use	Useful part of plant	Name of active ingredient	Concentration of insecticidal material	Effectiveness	Name of crop	Place of use.
		d) Virus affected leaves of cowpea are treated with virus-infected sap from chilli leaves.	Sap of leaf	Virus inhibiting gradient is present in all parts of plant.	-	Effect preventive measure of virus before its infection affects the plant.	Cowpea	
3. <i>Derris elliptica</i>	Azuki bean beetle	a) Freshly cut roots having 2-6 cm. length are pounded together with soap and little water. When roots are completely shredded into fibres the liquid is filtered off through fine cloth.	Root	Rotenone	1 part soap 4 parts roots 225 parts water			
<i>D. malaccensis</i>	Army worm, American bollworm, Diamondback moth, Fruit fly, Mediterranean fruit fly, Melon aphid.	b) Powdered dust of deris	Root		b) 100 lit water 500 g. Neutral soap 1 kg. derris			
<i>D. viliginosa</i>	Fungus <i>Pyricularia oryzae</i> young larvae of Caterpillars, aphids and beetles	c) Stirring of 2.5 kg. derris dust into 400 litres of soap solution	Root		c) 2.5 kg derris 400 lit soap solution.	Effective against apple aphid		
		d) Pulverised derris roots are diluted with talc in the proportion of 1:5, 1:10 and 1:20 and dusted over the cabbage crop.	Rotenone		1:5, 1:10, 1:20 Three application 8 30 kg./ha.	Effective against imported cabbage worm and cabbage loopers	Cabbage	
		e) Mixture of Pyrethrum (1,168 Pyrethrin), 208 derris dust, 508 alumina.			308 Pyrethrin (1,168 Pyrethrin) 208 derris dust (48 rotenone) 508 Alumina	Effective against caterpillar and flea beetle, however, aphid and thrips were not controlled satisfactorily.	Cabbage	
					Two application at interval of week.			

ANNEXURE 3

PLANTS OF INSECTICIDAL IMPORTANCE

Source: Anil K. Gupta, Jyoti Kapoor & Rekha Shah, (1990) "Inventory of Peasant Innovations for Sustainable Development : An Annotated Bibliography", Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad, 1990.

Name of Plant	Name of Pest	Useful part of plant/stage	Name of crop on which tried	Region	Reference
1. <u>Calotropis</u>	Mealy bug	Leaves	Rice	Tamil Nadu	Balasubramanian (1988)
2. <u>Hibiscus (canabinus)</u>	Termite	Seed	Rice (Upland)	Tamil Nadu	" "
3. <u>Onion Allium</u>	Termite.	Plant	Turmeric	Tamil Nadu	" "
4. <u>Castor Ricinus cumunis</u>	a) <u>Spodoptera litura</u> b) Rhinoceros beetle	Plant Castor oil cake	Chilli In the kitchen garden	Tamil Nadu Tamil Nadu	" "
5. <u>Cowpea Vigna spl.</u>	Aphid	Living plant	-	-	" "
6. <u>Lobelia columnaris</u>	Stem borer and other almost common insects	Plant	-	-	Schriempf & Rainer (1988)
7. 'Kindsem' (Local name in Sanso language)	Weevil	-	-	-	Schriempf & Rainer (1988)
8. 'Gods' Tobacco	Aphid	-	Cabbage	-	Schriempf (1989)
9. <u>Areca nut Areca catechu</u>	Paddy bug	Flower	Paddy	Sri Lanka	Upawasa (1988)

Name of Plant	Name of Pest	Useful part of plant/stage	Name of crop on which tried	Region	Reference
10. Euphorbia sp.	Thrips	Chopped pieces with latex	Paddy	Srilanka	Upavasa (1988)
11. <u>Grliricida</u>	Rat	Leaves & Flower	-	-	-
12. 'Kuluvel'	Hoppers	Plant	-	-	-
13. 'BO'	-	Sand from the sacred tree	Paddy	-	-
14. 'Pitras'	-	Seed extract	-	Bangladesh	Gupta (1988)
15. Jute Corchorus <u>Ceputaria</u>	-	Seed powder	-	-	-
16. Coriandrum Sativum	-	Standing crop	Chickpea	Bangladesh	Haque et al. (1986)
17. Cactus (<u>Opuntia sps</u>)	-	Plant matrix	Paddy	Srilanka	PEST Group of Madras, 1988
18. Coconut (<u>Cocosnucifera</u>)	Paddy bugs	Coconut refuse	Paddy	Srilanka	-
19. 'Mee'	Rat	Root	-	Srilanka	-
20. Marigold (<u>Tagetis patula</u>)	Insects	Living plant	Cabbage	-	Reddy (1988)
21. Chilli (<u>Capsicum annuum</u>)	-	Chilli powder (fruit)	Cabbage	-	-
22. Pongamia Oil cake	Root nematodes white ant, weevil bug	Oil Cake	-	-	-
23. Citronella grass (<u>Cymbopogon citratus</u>)	Leafroller, Brown plant hopper	Grass	Paddy	Thailand	Stoll (1989)
24. <u>Stemona tuberosa</u>	Lepidoptera larvae (cater pillars)	Root	-	-	-

Name of Plant	Name of Pest	Useful part of plant/stage	Name of crop on which tried	Region	Reference
25. <u>Alpinia galanga</u>	<u>Plutella xylostella</u> , <u>Spodoptera litura</u>	Rhizome	Paddy	Thailand	Stoll (1989)
26. <u>Anamita cocculus</u>	Rice black bug. Rice bug (<u>Leptocorisa</u> spp.)	Seeds, Ripe fruits	Paddy	-	"
27. <u>Croton tiglium</u>	Rice stem borer, seed & root (<u>Chilo polychrysus</u>) <u>Bombyx mori</u> , <u>Dactynotus carthani</u> , <u>Dystrercus koenigii</u> , Flies, tobacco cut worm, <u>Rondotia menciata</u> , <u>spodoptera exiqua</u> , Snail, aphids, mulberry & fruit tree pest	Seed & Root	Paddy	South East Asia	"
28. <u>Curcuma domestica</u> <u>Curcuma longa</u>	Ants, <u>Attagenus magatoma</u> , Mites, <u>Rhizoperta dominica</u> , <u>Plutella xylostella</u> , <u>Sitophilus oryzae</u> , <u>Spodoptera</u> spp., <u>Tribolium castaneum</u> , <u>Tribolium confusum</u>	Rhizome	-	Thailand	Scheimpf & Rainer (1988)

Name of Plant	Name of Pest	Useful part of plant/stage	Name of crop on which tried	Region	Reference
29. <u>Pupatorium odoratum</u>	Aphids, <u>Spodoptera litura</u> , <u>Plutella xylostella</u> , Pest in stored mungbeans cut worm	Leaves, plant	Vegetable crop, Egg plant	Thailand	Stoll (1989)
30. <u>Derris elliptica</u> and <u>Derris molaccensis</u>	<u>Aphids</u> , <u>Adoretus versatus</u> , <u>Crocidolomia binotalis</u> , <u>Heliothis armigera</u> , <u>Lepidoptera</u> , <u>Leptinotarsa decemlineata</u> , <u>Margaronia indica</u> , <u>Plusia chalcites</u> , <u>Plutella xylostella</u> , <u>Spodoptera litura</u> , Flea beetles, Spidermites	Leaves, Root	Cabbage	South East Asia, India	Stoll (1989)

ANNEXURE 4

PLANTS USED FOR VETERINARY MEDICINE

Source : Mathias-Mundy, M. McCorkle; Ethnoveterinary Medicine: An Annotated Bibliography; Bibliographies in Technology and Social Change, No. 6, IOWA State University Research Foundation, ISSN 0896-1689, 1989.

Name	Purpose	Page	Country	Reference
<i>Valeriana sylvatica</i>	as a remedy to wound & swellings	135	Canada	Teit, James A. 1930
<i>Leptoteenia dissecta</i>				
<i>Pinus ponderosa</i>	locweed poisoning in herd animals	126	Spain	Sal cedo, Mario B 1986
<i>Psoralee glandulosa</i>	for ectoparasitic infestations	135	-	Tilman, Hermann J. 1983
<i>Lupinus mutabilis</i> (Turki)	to cure mange	136	Peru	Validizan, Hermillo and Angel maldonado
<i>Rumez patiens</i>	purgative for horses & herd fertility			
<i>Hura Crepitans</i>	Combating ecto parasitism	59	Andear	Bazalar, 1989
<i>humanripa</i>				
Utshavli (<i>Nicotiana paniculata</i>)				
<i>Minthostachys andino</i>	against ectoparasites	125	Peru	Roersch et al 1988
<i>Mio. garbensillo</i>	Cures eating of it, unidentified disease in small livestock and poultry	136	Peru	Validisan et al 1985
<i>Physalis, alkekengi</i>		50	Peru	Alarco et al 1988
<i>Acana, humanlipa tea</i>	for manage verminous gastroentritus	72	Peru	Choquehuanca, Rodriguez Semon 1987
<i>Senecio pseudotites</i>	Vermifuge to wash cattle	50	Peru	Alarco de Zadra 1988
<i>Sesbania aculeata</i>	used as toxic to made dog	25	Nigeria	Ibrahim 1985,198
<i>Sesbania aegyptica</i>	massal healers in case of retained placenta	24	Mauritius	Schwabe 1979,43
<i>Tephrosia purpuria</i>	used as toxic to made dog	17	Nigerian	Ba 1982,48
<i>Calotropis proceras vilka wilka</i>	more fierce	99	Peru	Livai Jorge A 1985
<i>Catechu (Hura Crepitans)</i>	Serve as a purgatives for animals	50	Peru	Alarco de Zadra Adriana 1988
<i>Chilca (Eupatorium amygdalinum)</i>				
<i>Eupatorium Fingustrinn)</i>				
<i>Piper angustifolium</i>	to cleanse wounds	50	Peru	
<i>Piper elongatum</i>				

Name	Purpose	Page	Country	Reference
<i>Senecio pseudotitites</i> <i>Senecio vulgaris</i>	vermifuge	50	Peru	-
<i>Physalis alkekengi</i>	to treat unidentified disease in small livestock and Poultry	50	Peru	Alarco de Zadro Adriana 1988
<i>Jaya shipita</i> <i>Cynara Scolymus</i>	to treat ovine liver fluke	54	Peru	Arevalo Franscico Hernando Bazalar 1989b.
<i>Ficus Capensus</i>	to enhance livestock fertility	35	Indonesia	---
<i>Tamarindus indica</i> <i>Abrus precatorius</i>	neurological condition mysterious to them	35	Peru	Ibrahim 1986.
<i>Ficus glumassol</i>	Vaginal problems	94	-	Kerharo J 1964
<i>Psoralea glandulosa</i>	antidote to astragalus	17	Andes	Mc Corkle 1982
<i>Melissonia campestris</i>	Washing their hands	16	Nigeria	Ibrahim 1986
barbasco	combat lice and mange in herd animals	26	Andes	Moscoso cartilla 1953
<i>Rumex patientia</i>	-	26	Somal	-
<i>Euphorbia somalensis</i> <i>Ipomea roduntifolia</i>	-	26	Somal	-
<i>Ipomea cairca</i>	Used as toxic	17	Nigerian	Ba. 1982
<i>Lawsonia inermis</i>	to increase fertility	35	--	marx. 1984:113
<i>Acacia sps.</i> <i>criata</i>	styptre for freshly bleeding wounds	22	Nigerian	marx 1984:113 croix 1972:24
<i>Acacia arabra</i>	-	-	-	-
<i>Acacia senegal</i>	Stomach ailments	94	-	-
<i>Afromosia laxiflora</i>	to drive off the snakes	94	-	-
<i>Ajane ajana</i>	to combat pulmonary and intestinal parasites in ruminants and humans	70	Andes	-

Name	Purpose	Page	Country	Reference
<i>Acacia catechu</i>				
<i>Anthenus nobilis</i>				
<i>Cestanea Vulgaris</i>	Antidiarrheal agents in both old and new world	55	Mexico	Aubert, Ivonne 1988
<i>Ceratonia Siliqua</i>				
<i>Herdeum Vulgare</i>				
<i>Lycium Salicaria</i>				
<i>Oryzias Sativa</i>				
<i>Papaver Somniferum</i>				
<i>Polygonum bistorta</i>				
<i>Quercus robur</i> lex				
<i>Aloe barteri</i>				
<i>Terminalia avicennoides</i>	activity against	90	Africa	Ibrahim, MAN Nwude RA Ogunmusa Y.O.Aliu, 1984
<i>Annona Senegalensis</i>	<i>Nippostrongylus</i>			
<i>Cassia occidentalis</i>	<i>brasilensis</i> in rats			
<i>Arctostaphylos leucocarpus</i>				
<i>Diospyros mespiliformis</i>				
<i>Valeriana sylvatica</i>	remedies for wounds and swellings	135	Canada	Telt. James A. 1930
<i>Leptocarpus dissecta</i>				
<i>pinus ponderosa</i>				
<i>Rauwolfia Serpentina</i>	hypotensive and tranquilizers	4		Ackerknecht 1971 and Huard 1969
<i>Cymbretum mucronatum</i>	Guinea worm	4		Ibrahim 1986; 196
<i>Mitragyna Stipulosa</i>				Anjanika, 1986, 1988
<i>Leptadenia reticulata</i>	Milk yields	14		Caceves vege 1989; 165
<i>Aspidium Filix-Mas</i>	hepatic distomiasis	14		Caballero osorio 1984 a & b
<i>Mintostachys ardina</i> (Muna)	animal & human ills (Muna)	14	Andes	
<i>Lupinus mutabilis</i> (tarwi)	ectoparasitism in alpaca	14	Andes	Avila Cazorla et al 1985 a & b & Jimenez J. et al 1983
<i>Cucurbita maxima</i>	gastro intestinal worms of sheep	14	Duch	Arewalo & bazalar 1989 a
<i>Senecio akhane</i> humunlipe				
<i>Cynara Scolymus</i> (artichoke)	Liver fluke in sheep	14	Andes	Arewalo and Bozalar 1989b
Jaya - Schipita				
<i>Helopsis Longipes</i>	<i>E. Coli</i> , <i>Staphylococcus</i>	14	Mexican	Romero Ramirez et al 1988

aureus, of horses & sheep

Name	Purpose	Page	Country	Reference
<i>Helienium quadridentatum</i> and ground garlic	fungal diseases of internal parasites	14	"	Auro Angulo & Sumano Logez 1988 and Pena, Heaz 1988
Species of Aloe, and Cassia	for variety of treatments	15	Nepal	FAO 1980 A, FAO 1984d
<i>Geneva cambretum</i> and <i>Mitragyna</i>	Guinea worm & for anthelmintic for cattle & buffalo and haemorrhaging from the bare of tusk in elephants	15	China	FAO 1984 b; 18,31
Garlic	Veterinary pharmacopoeia	15	European driven culture	Shata 1976
Tobacco	for ecto & endoparasites	15	Nigeria	Shata 1976
<i>Neijsonia campestris</i>	Washing hands to avoid	16	Pulari	Ibrahim 1986:197
<i>Cuscuta Senegalensis</i>	microbes			Sokomba et al 1983
<i>Helienium quadridentatum</i>	eyewash for kerato conjunctivitis in sheep	16	Andes	Fulcrand 1983
<i>Trichocereus Sps</i>	bloat in cattle	"	"	Lindo Ravilla, 1982
<i>hinojo(Myrsiphyllum sp)</i>	to relieve the swelling of the udder in lactating cows.	16	Andes	(Pretee 1988a)
<i>Palenites aegyptica</i>	Snake bite in livestock	17	Somali	ba 1982:88
<i>tabarak(seeds)</i>	Skin diseases in camels	17	"	(Wolfing and Solled 1986:27:13)
<i>Dipradi Longifolium</i>				
<i>Ipomoea esarifolia</i> or <i>catapillars</i>	epizootic abortions	17	Nigeria	Ba 1982:48
<i>Calotropica sp</i>	abscesses	17	"	Wolfang end Sallod 1986:1)
<i>Piper angustifolium</i> <i>Piper elongatum</i>	To cleanse the wounds to heal	19	Peru	Alarco de Zedra
<i>Haploppapus Sps</i>	"	19	Chile	Forga & Fastra 1988 I:177

Name	Purpose	Page	Country	Reference
tumeric cooked in the oil of neem (Azadirachta indica)	Keeps away flies & insects and speeds healing of wounds	19	Sri Lanka	Kopczynska - Jaworska 1961:436
<i>Jaya - shipita akhna humanilpa</i>	Liver fluke & gastro intestinal parasites	26	Nigerian	Carlier 1981:116
<i>Curcuma Sps</i>	Jaundice	35	Indonesia	Pao 1980:9
<i>Ficus Cepensis</i>	Livestock fertility	35	Indonesia	Ibrahim 1980:262
<i>Arbus precatorius & Tamarindicus indica</i>	Foot & mouth diseases	35	Nigerian	Ibrahim 1986:199
Miyoko Miyo or Iliemamiyo Aprinacae incarum	To treat liver fluke in cattle and sheep	87	Peru	Herrera, Fortunato L 1941
<i>Azadirachta indica</i>	Infestered wounds are dressed with crushed fresh tumeric cooked in the oil of neem	19	Sri Lanka	Kopczynsk Jawanska, 1961
<i>Chaullia lago</i>	liver fluke	118		Palacios Rios, Felix 1995
<i>Acacia senegal</i>	Stomach ailment	94		Kerharo J and J.G. Adam 1964
<i>Carica papaya</i>	colics	-		-
<i>Annona senegulensis</i>	enhanced fertility & lactation	-		-
<i>Ferretia apodanthera</i>	Wounds	-		-
<i>Borren's verticillata</i>				
<i>Colotropica provera</i>				
<i>Ficus glumosa</i>	Vaginal problems	-		-
<i>Acacia senul</i>	purgatives	-		-
<i>Aloe Vera</i>	Healing wounds	135	Mexico	Sumano Lopez, Ana Auro, Angulo and Luis Ocampo Cambros 1988
<i>Mimosa lchuireflora</i>				
<i>Desmodium pilcatum</i>				
<i>Drymis sps</i>	To exterminate all types of plague in animals	83	Chile	Forga, Cristina & Jorga Lastra 1988
<i>Haplopagus Sps</i>	to heal wounds	83	-	-
Cam quellyon	aphrodisiac for both animals & humans	83	India	-

Name	Purpose	Page	Country	Reference
bougain Villaea Verbesum tbapsus crataegus mexicana cucalyptus	treatment for bronchitus	137	Mexico	Vasquez manriquez Leticia Hestor Sumano Lepez, and Luis A 1988

Notes: Page number refers to the page of the bibliography by Mathias Mundy and M. McCorkle (1989) on which reference appears. The detailed references are available in the bibliography.

Annexure 5

SELECTED PLANTS OF PESTICIDAL IMPORTANCE

(Number of species= 280, Number of references in this review = 306

NAME OF THE PLANT WITH FREQUENCY OF REFERENCES

Ablemoschus esculentus		Cocos nucifera (Coconut)	2
Acorus calamns	2	Collinus	
Adhatoda vasica	1	Corchorus capsularis (Jute)	
Aegle marmelos	1	Coriandrum sativum (Coriander)	
Ageratum conyzoides	2	Corus calamus	
Allium cepa (Onion)	2	Cotton	
Allium sativum (Garlic)		Croton sparsiflorum	
Alpinia galanga		Croton tigilium	
Anamita cocculus		Cucumis Sativa	
Andographis paniculata		Cuminum cyminum	
Annona squamosa	3	Curcuma elliptica	
Antherigona soccata		Curcuma longa (Turmeric)	
'Anuchhadi'		Cymbopogon winterianus	
Areca catechu (Arecanut)		Cynodon dactylon	
Aristolochia bracteata		Cyperus rotundus	
(Kidamari)		Datura sps.	
Arrowat		'Dharak'	
Artemisia vulgaris	2	'Dhorek'	
Artocarpus heterophyllus		Derris indica ('Karanj')	
('Phanas')		Derris molaccensis	
Azadirachta indica		Derris robusta	
Bambusa arundinacea		Derris uliginosa	
Bassia latifolia		Dichrocephala latifolia	
Bidens biternatea		Diospyros chloroxylon	
Blepharis asperrima		Dregea volubites ('Dodi')	
'Bo'		Eclipta erecta	
Brassica juncea		Eclipta alba	
Brassica nigra (Mustard)	3	Eleusine coracana ('Nagli')	
Calamus		Entada scandens	
Calophyllum inophyllum	4	Etholia eonyzoides	
Calotropis gigantia		Eucalyptus citriodora	
'Caner'		Eupatrium odoratum	
Capsicum frutescens	4	Euphorbia sps.	
Carthamus tinctorius		Fagonia eretica	
(Safflower)		Fagonia Fretica ('Dhamasa')	
Cedrus deodara	3	Garcinia indica	
Cheistanthus collinus		Garcinia morella	
Cicer arietinum		Ginger	
Cinnamomum camphora		Gliricidia	
Citronella	2	Glycosoma morella	
Citrus medica		Glycosoma pentaphyllum	
Clerodendrum fragrans		Helianthus annuus (Sunflower)	
Clerodendrum siphonanthus		Hibiscus cannabinus	
Clerodendrum multiflorum		'Hippe'	
('Arni')		Ipomoea Carnea	
Clerodendrum sps.			

Ipomoea Sp.	2	Sorghum bicolor
Jatropha curcas (Rathanjyoti)		Spienthes acmella
`Kachura'		Stachytarpheta urticaefolia
`Kadu'		Stemona tuberosa
`Kapak'		Sweelflag
`Karite'		Swietnia Mohagoni
`Kindzem'		Tagetus petula (Marigold)
`Kuluwel'		Tancrium viscidium
Lantana camara		Tephrosia candida
Lavandula gibsonii	2	Tephrosia purpurea
Leucas urticaefolia (`Kubo')		Thevetia neriifolia
Linum usitatissimum (Linseed)		Tribulus terrestris
Lobelia calumnaris		Tridax procumbens
Madhuca butyracea		Tylophora asthmatica
Madhuca latifolia (`Mahua')	2	`Undi'
Madhuca longifolia		Vasumbu'
`Maravally'		Vigna unguiculata (Cowpea)
`Margoson'		Vitevaria indica
Melia azadirach		Vitex negundo
`Mee'		
`Nagarsanda'		
Nerium sps.		
Nicotiana tobacum (Tobacco)	3	
Ninata		
Ocimum basilicum		
Ocimum basilicum (`Damara')		
Ocimum sanctum		
Oimum gratissimum		
Olycosomic pentophyllum		
Oryza sativa (Rice bran)		
Oxystelma secamone (`Dudhi')		
Palm		
Parthenium hysterophorus		
`Pinnai'		
`Pitras'		
Plumbago zeylanica		
Pongamia pinnata		
Pongamia glabra	2	
Pongamia pinnata	2	
Pongamia sp.	5	
`Pulwara'		
Pyrethrum		
Rape		
Repelin		
Ricinus communis (Castor)	3	
Sapindus emarginatus (Soapnut)		
Saw dust		
`Sadabahar'		
`Sal'		
`Simata'		
`Sinara'		
Schleichera oleosa (`Kusum')		
Sesamum indicum (Sesamum)		
Solanum khasiamum		
Solanum melongana		

Annexure-6**NAME OF INSECT PESTS AND NUMBER OF PLANTS USED FOR ITS CONTROL**

Name of The Pest	No of Plants
<i>Acedes aegypti</i>	2
<i>Acedes Gegypti</i>	1
<i>Achae jonata</i>	2
<i>Amsacta moorei</i>	5
<i>Aphis gossypii</i>	5
<i>Aracerus fasciculutan</i>	1
<i>Artherigonda soccata</i>	5
<i>Callosobruchus chinensis</i>	45
<i>Campoletis chlorideae</i>	2
<i>Castor semilooper</i>	1
<i>Centrocooccus insolitus</i>	4
<i>Climax lecturalis</i>	1
<i>Climax fatigans</i>	3
<i>Cnaphalocroa medinalis</i>	2
<i>Craphalocropcos medinalis</i>	1
<i>Culex pipers fatigans</i>	1
<i>Culex fatigans</i>	1
<i>Cylas formicarias</i>	1
<i>Drsdercus koenigii</i>	2
<i>Dysdercus angulatus</i>	1
<i>Earias vitella</i>	4
<i>Green leaf hopper</i>	8
<i>Haemadipsa sylvestris</i>	15
<i>Heliothis armigera</i>	1

Name of The Pest	No of Plants
Lassiderma sericorne	1
Lathyrus satvvs	1
Mesomorplus villiger	2
Mosquito	4
Musca domestica	6
Mythimna separata	3
Myzus persicae	1
Nephotettix virescus	10
Nilaparata lugens	2
Oil bistriga	2
Percalia ricini	1
Perplaneta americana	4
Phyzopertha sominix	1
Pieris brassicae	2
Pthorimaea operculella	8
Rhizopertha cthinopus	2
Rhizopertha rominica	3
Sitophilus Oryzae	3
Sitotroga Oryzace	1
Sitotroga cerealella	1
Spodoptera litura	24
Stored Grain pests	1
Tribolium casteneum	12
Wysdercus Cingulatus	1
Total plants used for control of 48 insects	210

ANNEXURE - 7**NUMBER OF PLANT SPECIES USED FOR CONTROLLING DIFFERENT ANIMAL DISEASES AND OTHER AILMENTS**

Animal Diseases	Number of Plants of Medicinal Importance
Absceses	1
Against Nippostronglyses <u>brazilensis</u> in vats	6
Animal and human ills	1
Anthelintic for cattle and buffalow haemorroging	2
Antidiarrheal agents	10
Antidote to astragalus	1
Aphrodisae for both animals and humans	1
Bloat in Cattle	1
Bronchitas	1
Colies	1
Eating of it	1
Ectoparasitic infestations	4
Endo parasites	1
Epizoodic abortions	1
E. coli Stapuylococan of horses and sheep	1
Foot & mouth disease	2
For variety of treatment	3
Fungal disease of internal parasite	3
Guinea worm	1
Hepatic distoniasis	1
Herd fertility	8
Hypotensive and tranginlizen	1
Jaundice	1

Animal Diseases	Number of Plants of Medicinal Importance
Keroto conjunctivitis	1
Liver fluke in Sheep	6
Locweed poisoning in herd animals	1
Masai Lealers in Case of retained placenta	1
Microbes	1
Neurological condition mysterious to them	2
Purgatives for horses	8
Skin diseases in camels	1
Snake bite	1
Stomach ailments	3
To combat pulmanory and intestinal parasites	1
To cure Mange	8
To drive off the snakes	1
To heat ovine liver fluke	2
Toxic to make dog more fierce	4
Unidentified disease in small livestock and poultry	3
Vaginal problems	2
Vermifuge	3
Verminous gastroentritus	2
Veterinary pharmacopoeia	1
Wash Cattle	1
Washing hands	1
Wound and Swelling	18
Total plants used for curing of 46 animal diseases	125

Annexure-8

Source: SOUVENIR OF Central Tobacco Research Institute, ICAR, 1990.

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
1	Ajwa (Cedrus deodara)	Castor semi looper (Achaee janata)	Ajwan oil	Ajwanoil	Castor	Tare(1988)
2	Artemisia Vulgaris	(a) Acedes aegypti b) (Culex fatigans) (c) Musca domestica) (d) Mythimna separata	Extracted oil Acetone Extract Acetone Extract Acetone Extract	Acetone extract of Artemisia Vulgaris Acetone extract of Artemisia Vulgaris Acetone extract of Artemisia Vulgaris	Castor Castor Castor Castor	a) Deshpande (1988) b) Deshpande (1988) c) Deshpande (1980) d) Deshpande (1988)
3	Lavendula gibsonii	(a) Acedes Gegypti (b)Tribolium castaneum	Extracted Oil	Acetone extract of Lavendula gibsonii Acetone extract is proposed	Castor	a) SHARMA (1981) b) Sharma (1981)
4	Ocimum Sanctum	(a) Amsacta moorei (b) Green leaf hopper	Extract	Aqueous extract of Ocimum Sanctum	Groundnut	a) Verma (1985) b) Narasimhan (1988)
5	Brassica Juncea	(a) Amsacta moorei (b) Callosobru	Extract	Aqueous extract of Brassica Juncea	Groundnut	a) Verma (1985)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
		Chinensis			Used in cowpen	b) Singh (1987)
6	Cyprus rotundus	Amsacta Olbistriga				Verma (1985)
7	Cynodon dectylon	Amsacta Olbistriga				Verma (1985)
8	Pongamia					
(a)	Pongamia pinnata	a) Amsacta moorei	Oil	Oil of Pongam		a) Verma (1985)
(b)	Pongamia cake	b) Mesomorphus Villiger	Cake		Tobacco	b) Joshi (1968)
		c) Mesomorphus Villiger	Cake		Tobacco	c) Joshi (1974)
		d) Nephotettix virescus	Seed	Oil is extracted from seed		d) Mariappan (1988)
	Pongamia Oil	e) Spodoptera litura		Oil is prepared	Rice	e) Chakraborty (1976)
9	Annona squamosa	a) Achae				

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
		Janata			Castor	a) Purohit (1989)
		b) Colosso- bruchus Chinensis	extract	Custard apple extract in combination with neem extract	Green gram	b) Yadav (1985)
		c) Green leaf hopper				c) Marsimhan (1988)
		d) Musca domestica				d) Qadri (1985)
		e) Musca domestica				e) Qadri (1977)
		f) Nephrotetlix virescens	Custard apple oil	Custard apple oil + neem oil	Rice	f) Mariappan (1983 &
		g) Nephrotetlix virescens	Seed	Oil is extracted from seed	Rice	g) Mariappan (1988)
		h) Periplaneta americana				h) Qadri (1985)
		i) Periplaneta americana		Neem, garlic & custard		i) Qadri (1985)
		j) Physopertha sominix		Neem, garlic & custard	(neem garlic custard)	j) Qadri (1985)
10	Dalaspynos Chloroxylon	Achal Janata		Custard apple + neem extract		Purohit (1989)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
11	Linseed	Antherigona soccata		Linseed	Coating of sorghum seed	Sukhani (1980)
12	Rice (Oryza sativa L)	Antherigona soccatta	Rice bran oil		Coating of sorghum seeds with rice bran oil	Sukhani (1980)
13	'Kadu'	Antherigona soccatta	Leaf Extract		Leaf extract is used in sorghum crop	Kandalaker (1989)
14	'Dudhi'	Antherigona soccatta	Leaf extract		Sorghum	Kandalaker (1989)
15	'Gokhary'		Leaf extract		Sorghum Crop	Kandalaker (1989)
16	Euptorium	a) Aphis gossypii			Brinjal	a) Sardanna (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
		b) Centroccocus insolitus			Brinjal	b) Saradamma (1988)
17	Sesamum	a) Aphis gossypii	Oil		Cotton	a) Vanketesan (1987)
		b) Calloso bruchus Chinensis	Oil		Green gram	b) Ali (1983)
		c) Calloso- bruchus Chinensis				c) Sujatha (1985)
		d) Spodoptera litura	Sesamum Oil	Sesamum Oil + Aqueous extract of neem seed lerne; at 6%	Green gram	d) Rajasekharan (198)
18	Clerodendrum	a) Aphis gossypii			Brinjal	a) Saradamma (1988)
		b) Aracerus fasciculutus			Tapioca	b) Ambicadevi (1988)
		c) Centroccocus insolitus				c) Saradamma (1988)
19	Nerium	a) Aphis gossypii			Brinjal	a) Saradamma (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1		2	3	4	5	6
		b) Centrococcus insolitus			Brinjal	b) Saradamma (1988)
20	Thevetia (Thevetia nerifolia)	a) Aphis gossypii	Benzene extract		a) Benzene extract & water extract	a) Saradamma (1988)
		b) Calloso- bruchus Chinensis	Leaves, twigs & young branches		was tested in Brinjal crop greengram	b) Pandey (1986)
		c) -do-			greengram	c) Pandey (1976)
		d) Centrococcus insolitus		d) Benzene, water extract	Brinjal	d) Saradamma (1988)
21	Citronella oil	a) Bruchus Chinensis				
		b) Periplaneta americana				b) Sardar (1987)
		c) Tribolium Castaneum				c) Sardar (1987)
22	Ageratum Conyzoides	Collosobruchus Chinensis	Leaves flowers			Pandey (1986)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
			buds			
23	Ipomoea Carnea	a) Colosso- brucus chinesei b) colosso- brucus maculacus	Leaves	cocopea		
24	Lantana Camera	Collosobruchus Chinensis	Leaves & flowers			Pandey (1986)
25	'Rape'	Collosobruchus Chinensis	Oil		greengram	Ali (1983)
26	Coconut	Callosobru- chus Chinensis	Oil		greengram	Ali (1983)
27	Mustard	Callosobru- chus Chinensis do-	Oil		greengram	Ali (1983)
			Oil		redgram	Sangappa (1977)
28	'Mahua'	a) Calloso- bruchus Chinensis b) Graphalo- crpcos	Oil of Mahua		greengram rice	a) Ali (1983) b) Rajasekharan (198

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
		Medinalis				
		(c) Phorimaea Operculella	Extract or oil	Oil or extract is prepared	Potato	(c) Shelke (1985)
29	Cotton	Callosobru- chus Chinensis	Seed		greengram	(a) Sujatha (1985)
		-do-	Oil		greengram	(b) Sangappa (1977)
		Nephotettir virescus	Seed	Seed oil is extracted	rice crop	(c) Srinivasulu (1988)
30	'Palm'	Callosobru- chus Chinensis	Oil		green gram	(a) Sujatha (1985)
		Callosobru- chus Maculacus	Oil		coupea, Bamba & groundnut crops	(b) Pareira (1983)
31	Adhatoda Vasica	(a) Calloso- bruchus Chinensis			grain	(a) Pandey (1976)
		(b) Calloso- brychus Maculacus			coupea	(b) Neetabhaduri (198)
32	'Sadabahar'	Calloso-	Leaf	Leaf is pounded	Gram	Pandey (1976)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
33	'Caner'	bruchus Chinensis Calloso- bruchus Chinensis	powder Fruit	Powered drupes of caner	Gram	Pandey (1976)
34	Garlic Allium sativum	a) Calloso- bruchus Chinensis b) " " c) " " d) Earias Vitella e) Musca domestica f) Earias Vitella g) Peripla- neta americana h) Rhyzo- pertha dominica i) " "	Petroleum eather extract Plant extract Clove	Petroleum eather extract of garlic Extract of clove + neem seed + oleoresin Garlic clove extract & neem seed in combina- tion with oleoresin	Gram Cowpea Coupea okra crop okra crop	a) Pandey (1976) b) Yadav (1987) c) Gadri (1980) d) Chouhan (1989) e) Gadri (1985) f) Associated (1986) ADF g) Gadri (1985) h) Gadri (1985) i) Gadri (1980)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
35	'Sweetflag'	a) Calloso bruchus chinensis	Rhizome	Extract is prepared from rhizomes by using petroleum eather	Gram	Pandey (1976)
36	Datura	a) Calloso- bruchus Chinensis			Cowpea	a) Yadav (1987)_
		b) Earias Vitella	Plant extract	Extract is made	okra crop	b) Chouhan (1989)
		c) " "			"	c) Associated (1986)
37	'Ak'	Calloso- bruchus Chinensis	Leaf		Cowpea	Yadav (1987)
38	Soap nut Sapindus	Calloso bruchus Chinensis	Shell & Sheed		Cowpea	Yadav (1987)
39	'Karanja'	a) Calloso- bruchus Chinensis			Sorghum green	a) Rajasekaran (1985)
		b) Calloso- bruchus Chinensis	Oil or extract		potato	b) Netabhaduri (1985)
	Karanja	c) Pthorimaea				

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
		operculella				(c) Shelke (1985)
		d) Sitotroga Cerealella				
		e) Spodoptera litura			Sorghum an green gram	
40	Sunflower	Calloso bruchus Chinensis	Oil		red gram	Sangappa (1977)
41	Safflower	Calloso bruchus Chinensis	Oil		redgram	Sangappa (1977)
42	Castor	a) Calloso bruchus Chinensis	Oil		redgram	a) Sangappa (1977)
		b) Calloso bruchus Maculacus			redgram	b) Singh (1987)
43	'Hippe'	Calloso bruchus Chinensis	Oil		redgram	Sangappa (1977)
44	'Pulvura' (Meduca sps)	a) Calloso bruchus Chinensis	Seed	Seed extract is prepared		a) Lalitha (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
		b) <i>Musca domestica</i>	Seed	Seed extract		b) Lalitha (1988)
45	<i>Pongamia glabra</i>	<i>Callosobruchus maculatus</i>			Cowpea	a) Singh (1987)
46	'Karite'	<i>Callosobruchus maculatus</i>	Oil		Cowpea bambara groundnut	Pareira (1983)
47	<i>Parthenium hysterophorus</i>	a) <i>Callosobruchus maculatus</i>			Cowpea	a) Neetabhaduri (1985)
		b) <i>Dysdercus angulatus</i>				b) Gunasekaran (1985)
		c) <i>Pericallia ricini</i>				c) Tilak (1977)
48	<i>Tridax procumbens</i>	<i>Callosobruchus maculatus</i>			Cowpea	Neetabhaduri (1985)
49	'Undi'	<i>Callosobruchus maculatus</i>			Cowpea	Ketkar (1986)
50	'Sal'	<i>Callosobruchus maculatus</i>			Cowpea	Ketkar (1986)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
51	'Kusum'	Callosobruchus maculatus	oil		Coupea	Ketkar (1986)
52	'Karanj'	Campoplex Chlorideae	oil	Mixture of Karanj & Need oil was used	Chickpea	Prasad (1987)
53	'Arrowat'	a) Climex lecturalis b) Climex fatigans				Gadri (1985) Gadar (1985)
54	'Kachura'	a) Climex lectaralis b) Climex fatigans				a) Gadar (1985) b) Gadar (1985)
55	'Maravally'	Cnaphalocrocis medinalis			rice	Rajasekharan (1987)
56	'Pinnai'	Cnaphalocrocis medinalis			rice shop	Rajasekharan (1987)
57	Margoson-D	a) Culex pipiens fatigans b) Aedes Aegypti			Tested on mosquitoes -do-	a) Koul (1988)a b) Koul (1988)a

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
		(c) <i>Dysdercus</i> <i>Koenigii</i>			cotton	(c) Koul (1988)
58	Glyco- somic Pentaphyllum ilum	(a) <i>Culex</i> <i>fatigera</i> (b) <i>Mythimna</i> <i>separate</i>				(a) Deshpande (1988) (b) Deshpande (1988)
59	Saw dust	(cylas <i>formicarius</i>		Sawdust and Neem Cake	Sweet potato	Rajamma (1982)
60	<i>Tribulus</i> <i>terrestris</i>	(a) <i>Wysdercus</i> <i>cingulatus</i> (b) Green leaf hopper (c) <i>Heliothis</i> <i>armigera</i> (d) <i>Spodoptera</i> <i>litura</i>		Petroleum extract Petroleum extract		(a) Gunasekaran (1985) (b) Narasimhan (1988) (c) Gunasekharan (198) (d) Gunasekharan (198)
61	<i>Lavandula</i> <i>gibsonii</i>	(a) <i>Wysdercus</i> <i>koenigii</i> (b) <i>Musca</i> <i>domestica</i> (c) <i>Phthorimaea</i> <i>Operculella</i>	Extract	Acetone extract is prepared Acetone extract is prepared	Potato	(a) Sharma (1981) (b) Sharma (1981) (c) Sharma (1981)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
62	Aegle marmelos	Green leaf hopper				Narasimhan (1988)
63	Croton Sparisiflorus	Green leaf hopper				Narasimhan (1988)
64	Vitex negundo	a) Green leaf hopper				a) Narasimhan (1988)
		b) Lathyrus Satuvys			Pulses	b) Rahman (1982)
		c) Spodoptera litura			Castor leaf	c) Bai (1985)
		d) Spodoptera litura			Castor leaf	d) Subhadrabai (1985)
		e) Stored grain pests			Rice	e) David (1988)
65	Calophyllum nophyllum	Green leaf hopper				a) Narasimhan (1988)
		Nephatettix virescns	Seed	Oils extracted from seed	Rice	b) Marippan (1988)
66	Nadhuca longifolia, Var latifolia	a) Green leaf hopper				a) Narasimhan (1988)
		b) Mosquito	Petroleum ether extract		Mosquito	b) Sujatha (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
		(c) Nephote lettix virescna				(c) Mariappan (1988)
67	Acorus calamas	a) Haemadipsa Sylvestris			Tested on land leech	a) Saileek (1988)
		b) Tribolium castaneum		b) Extract is prepared		b) Prakash (1985)
68	Ageratum Conyzoides	Haemadipsa Sylvestris			Tested on land leech	Saileela (1988)
69	Cymbopogon winterianus	Haemadipsa Sylvestris				Saileela (1988)
70	Cinnamomum Camphora	Haemadipsa Sylvestris			Tested on land leech	Saileela (1988)
71	Entada scandens	Haemadipsa Sylvestris			Land leech	Saileela (1988)
72	Eucalyptus Citriodora	Haemadipsa Sylvestris			Land leech	Saileela (1988)
73	Etholia Conyzoides	Haemadipsa Sylvestris			Land leech	Saileela (1988)
74	Dichrocephalia latifolia	Haemadipsa Sylvestris			Land leech	Saileela (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCTS	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
75	Cucumis Sativa	Haemadipsa Sylvestris'			Land leech	Saileela (1988)
76	Ocimum gratissimum	Haemadipsa Sylvestris			Land leech	Saileela (1988)
77	Ocimum basilicum	Haemadipsa Sylvestris			Land leech	Saileela (1988)
78	Tephrosia purpurea	Haemadipsa Sylvestric			Land leech	Saileela (1988)
79	Tancrium viscidium	Haemadipsa Sylvestric			Land leech	Saileela (1988)
80	Spilanthes acmella	Haemadipsa Sylvestric			Land leech	Saileela (1988)
81	Solanum Khasianum	Haemadipsa Sylvestris			Land leech	Saileela (1988)
82	Turmeric	Lasioderma Serricorne	Different fractions of turmeric		Turmeric	Yadav (1986)
83	Corus Calamus	Mosquito	Petroleum ether extract		Mosquito	Sujatha (1988)
84	Bambusa arundinacea	Mosquito	Petroleum ether extract		Mosquito	Sujatha (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
85	Citrus medica	Mosquito	Petroleum ether extract		Mosquito	Sujatha (1988)
86	Plumbago zeylanica	Mythimna separata			Sorghum	Sharma (1983)
87	Vasumbu (Vegetable oil)	Myzus Parasicae			Chillie	Basha (1980)
88	'Ninata'	Nephotettix Viresns	Seed	Oil extracted from seed	Rice	Mariappen (1988)
89	Pongamia Mustard Brassica	Nephotettix Virescus	Seed	Oil extracted from seed	Rice	Srinivasulu (1988)
90	'Kapak'	Nephotettix Viresns	Seed	Seed oil is extracted	Rice	Srinivasulu (1988)
91	Eclipta alba	Nilaparata lugens			Rice	Rao (1979)
92	Eclipta erect	Nilaparata lugens	Root	Aqueous extract of root & shoot	Rice	Rao (1979)
93	Ajwan Cuminum cuminum	Phthorimaea operculella	Oil	Ajwaan oil and Cedrus deodura oil		TARE (1988)
94	Cedrus deodara	Phthorimaea operaculella	Oil	Cedrus deodura Oil of Ajwan Oil	Ajwan	TARE (1988)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
95	Blepharis parvman subsessles	Pthorimaea operculella				Deshpande (1988)
96	'Rathayoti'	Pthorimaea operculella	Oil or extract	Oil or extract is prepared	Potato	Shelke (1985)
97	'Dodi'	Pthorimaea Operculella	Oil or extract	Oil extract is prepared	Potato	Shelke (1985)
98	'Dharak'	Pieris brassicae	Kernel & fruit		Cabbage	Sundhu (1975)
99	Melia azodirach	Pieris brassicae	Drug	Drug of Malia Azadirach	Cabbage	Atwal (1964)
100	Custard Apple	Rhyzopertha dominica		Custard apple + neem extract	Household product	Qadri (1977)
101	Onion Allium	Rhyzoglyphus echinopus (Mushroom Mite)	Bulbs	Crude extract of onion bulls	Onion	Bandhopadhyay (1988)
102	Ginger Zingiber of ficinale	Rhyzoglyphus echinopus	Rhizome	Crude extract of ginger rhizome	gingers	Bandyopadhyay (1988)
103	Chilli Capsicumannuum	Rhyzoglyphus echinopus	Rhizome	Crude extracts of chilli fruit	Chilli	Bandyopadhyay (1988)
104	'Dhorek'	Sitotroga Oryzae	Drupes & leaves		Wheat	Teotia (1971)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
105	Tephrosia candida	Sitophilus oryzae				Jha (1988)
106	Clerodendrum Siphonanthus	Sitophilus oryzae				Jha (1988)
107	Clerodendrum fragrans	Sitophilus oryzae				Jha (1988)
108	Pongamia glabra	a) Silvanid				a) Prakash (1985)
		oryzaeophilus				
		b) Spodoptera		Oil is extracted		b) Rajasekharan (198
		litura				
109	Pongamia pinnata	a) Silvanid				a) Prakash (1985)
		oryzaeophilus				
		b) Tribolium		b) Extract is prepared		b) Prakash (1985)
		castaneum				
110	Acorus calamus	Silvanid				Prakash (1985)
		oryzaeophilus				
111	Cleistanthus Collinus	Silvanid				Prakash (1985)
		Oryzaeophilus				

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1		2	3	4	5	6
112	Olycosomic pentophyllum	Spodoptera litura				Deshpande (1988)
113	Stachytarpheta urticaefolia	Spodoptera litura			Castor leaf	Bai (1985)
114	Eucalyptus	Spodoptera litura				Chockalinigan (1986)
115	Andographis paniculata	a) Spodoptera litura		Acetone extract		a) Gunasekharan (198)
		b) Spodoptera litura	Whole plant	Extract of plant is prepared		b) Rajasekharan (198)
116	Calamus	Spodoptera litura	Oil			Koul (1987)
117	Wheat	Spodoptera litura	Floor of grain	Wheat floor + molasses		Parasuraman (1985)
118	Molasses	Spodoptera litura		Molasses + Wheat floor		Parasuraman (1985)
119	Swietenia mohagoni (`Mahogeny')	Spodoptera litura	Seed	Seed extract is prepared		Rajasekharan (1985)

S.NO	NAME OF PLANT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
1	2	3	4	5	6	
120	Tephrosia purpurea	Spodoptera litura		Maxima substance C (from Tephrosia purpurea)		Srimannarayana (1985)
121	Derris rubsta	Spodoptera litura		Conchocarpic acid is prepared from Derris rubsta		Srimannarayana (1985)
122	Repelin	Spodoptera litura			Tobacco	Subrahmanyam (1988)
123	Tylophora asthmatica	Spodoptera litura		Alkloid extracts of Tylophora asthmatica		Verma (1986)
124	Glycosamic pentaphyll	Spodoptera litura		Acetone extract of Glycosamic pentaphyll		Deshpande (1988)
125	Artemisia vulgaris	Spodoptera litura				Deshpande (1988)
126	Cheistanthus collinus	Tribolium Castaneum				Prakash (1985)
127	Basia latifolia	Tribolium Castaneum				Parmar (1987)
128	Pongamia pinnata	Tribolium Castaneum				Parmar (1987)

S.NO	NAME OF PLANT OR PLANT PRODUCT	NAME OF PEST	USEFUL PART OF PLANT & STAGE	METHOD OF PREPARATION	NAME OF CROP	SOURCE
	1	2	3	4	5	6
129	Colophyllum imphyllum	Tribolium Castaneum				Parmar (1987)
130	Garcinia india	Tribolium Castaneum				Parmar (1987)
131	Garcinia morella	Tribolium Castaneum				Parmar (1987)
133	Viteria indica	Tribolium Castaneum				Parmar (1987)

Louise Riotte "Carrots Love Tomatoes" secrets of companion planting for successful gardening, Fernal, Vermont: Storey Communications, Inc., 1989.

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Allium	Roses	Aphids, pests and moles
Aloe vera	-----	Rabbits, ulcers of radioactive origin
Anise (<u>Pimpinella anisum</u>)	-----	Insects bites
Asparagus (<u>Asparagus officinalis</u>)	Tomato	Nematode
Basil (<u>Ocimum basilicum</u>)	Tomato	Flies and mosquitoes
Bay (<u>Laurus nobilis</u>)	Cereals	Weevils
Black Nightshade	Potato	Colorado beetle
Calamus	-----	Keeps mosquitoes away
Carrots	Leaf lettuce and Leeks, raddishes, tomatoes, Chives, onions, rosemary, sage parsley and naustfliums	Carrotfly
Castor beans (<u>Ricinus communis</u>)	-----	Moles
Catnip (<u>Nepeta cataria</u>)	-----	Flee beetle
Cauliflower	Celery plants	White cabbage butterfly and blackrot
Celery (<u>Apium graveolens</u>)	Leeks, tomatoes, cauliflower, cabbage, bush beans, and all garden vegetables	Most of the insects
Cherry (<u>Prunus</u> ^{laviu})	Potato	Potato blight
Chestnut (<u>Castanea</u>)	American Chestnut	Chestnut blight

ANNEXURE - 9

Louise Riotte "Carrots Love Tomatoes" secrets of companion planting for successful gardening, Fernal, Vermont: Storey Communications, Inc., 1989.

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Allium	Roses	Aphids, pests and moles
Aloe vera	-----	Rabbits, ulcers of radioactive origin
Anise (<u>Pimpinella anisum</u>)	-----	Insects bites
Asparagus (<u>Asparagus officinalis</u>)	Tomato	Nematode
Basil (<u>Ocimum basilicum</u>)	Tomato	Flies and mosquitoes
Bay (<u>Lauris nobilis</u>)	Cereals	Weevils
Black Nightshade	Potato	Colorado beetle
Calamus	-----	Keeps mosquitoes away
Carrots	Leaf lettuce and Leeks, raddishes, tomatoes, Chives, onions, rosemary, sage parsley and naustfliums	Carrotfly
Castor beans (<u>Ricinus communis</u>)	-----	Moles
Catnip (<u>Nepeta cataria</u>)	-----	Flee beetle
Cauliflower	Celery plants	White cabbage butterfly and blackrot
Celery (<u>Apium graveolens</u>)	Leeks, tomatoes, cauliflower, cabbage, bush beans, and all garden vegetables	Most of the insects
Cherry (<u>Prunuslaviium</u>)	Potato	Potato blight
Chestnut (<u>Castanea</u>)	American Chestnut	Chestnut blight

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Chive (<u>Allium schoenoprasum</u>)	Carrots	Apple scab and Powdery mildew on goose berries and cucumbers
Collard (<u>Brassica oleraceae</u>)	Tomatoes	Flee beetle
Conifers	Onions (interplanting)	Prevent damage by squirrels
Coreopsis	Any nearby plants	Most of the insects
Coriander (<u>Coriandrum Sativum</u>)	-----	Aphids
Corn (<u>Zea mays</u>)	Potato, peas, beans, cucumbers, pumpkin, squash & sunflower	Caspophilus beetle Armyworm
Cotton (<u>Gossypium</u>)	Alfalfa	Root rot
Cucumber (<u>Cucumis sativus</u>)	Corn, radish, peas	Wilt cucumber beetle
Daffodil	-----	Mice
Datura (<u>Datura Stramonium</u>)	Pumpkins	Japanese beetle
Devil's shoestring (<u>Tephrosia Virginiana</u>)	-----	Insecticidal imp.
Euphorbia (<u>Euphorbia elsula</u>)	-----	Warts
Euphorbia (<u>Euphorbia lathyrus</u>)	-----	To deter moles and mice
Feverfew (<u>Chrysanthemum parthenium</u>)	-----	Insect repellent
Flax (<u>Linum usitatissimum</u>)	Carrots and Potatoes	Colarado Potato beetle
Fleabane	-----	Mosquito repellent

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Garlic (<u>Allium Sativum</u>)	Fruit trees and roses	Mosquitoes and aphids
Geranium	Roses, Grapes and Corn	Japanese beetle
Hemp (<u>Cannabis Sativa</u>)	Cabbage	To repel white cabbage butterflies
Henbit	-----	General insect repellent
Henbane	-----	Against disease
Horehound (<u>Marrubian vulgare</u>)	-----	Fly repellent
Horseraddish	Potato	Blister Beetle
Horsetail (<u>Equisetum arvense</u>)	-----	Mildew of roses, vegetables, grapes and stone fruits
Hyssop (<u>Hyssopus Officinalis</u>)	Grape vines, Cabbage	Cabbage moth
Lavender	-----	Clothes moth
Leek (<u>Allium porrum</u>)	-----	Carrot flies
Marigold	Potato, Strawberry, roses, various bulbs, tomato and beans	Against nematodes, Mexican bean beetle
May weed (<u>Anthemis cotula</u>)	-----	Flea, mice
Meadow Saffron (<u>Colchicum autumnale</u>)	-----	To treat gout
Melon	-----	Garden pests
Milkweed	-----	Cure warts or ring worm
Mint	Cabbage and tomatoes	White cabbage worm, cloths moth and flea beetle

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Molasses grass (<u>Melinis minutiflora</u>)	-----	Mosquito
Moth balls	-----	Repels mice and rabbits
Mugwort	-----	To repel lice
Mustard (<u>Brassica alba</u>)	-----	Nematodes
Narcissus	Marigold (<u>Tagetes erecta</u>)	Nematodes
Nasturtiums	Squash	Squash bugs
Oak	American chestnut	Chestnut blight, ant, aphid and mites
Oat (<u>Avena sativa</u>)	-----	White grubs
Onion	-----	Spraying of water solution of onion skin kills hemiptera parasite
Oregano (<u>Origanum vulgare</u>)	Broccoli	Cabbage butterfly
Oyster plant (<u>Schizanthus litoralis</u>)	-----	Carrot fly
Parsley (<u>Petroselinum hortense</u>)	a) Carrot b) Rose	Carrot flies Rise beetles
Pennyroyal (<u>Mentha Pulegium</u>)	a) Broccoli, Brussels, Cabbage b) --	Cabbage maggot Repellent against mosquitoes, and flea
Pepper (<u>Capsicum frutescens</u>)	-----	Aphids, caterpillar
Peppermint (<u>Mentha piperita</u>)	Cabbage	White cabbage butterfly and red ants
Peruvian Ground Cherry (<u>Nicotiana glauca</u>)	-----	Flies and white fly

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Pigweed (<u>Amaranthus retroflexus</u>)	Tomato	Imparts resistant to insect in tomato crop
Potato (<u>Solanum tuberosum</u>)	a) Bean	Colorado potato beetle, Mexican bean beetle
	b) Horsedish, Nightshad weed, Potato bug and Blister beetle	Potatobug and blister beetle
	c) Hemp	Potato blight
Pyrethrum (<u>Chrysanthemum cinerariaefolium</u>)	-----	Against bugs, and safe insecticide
Raddish (<u>Raphanus Sativus</u>)	a) Cucumbers, squash and melons	Cucumber beetle, spider mite
	b) Tomatoes	Spider mite
Rhubarb (<u>Rheum rhaponticum</u>)	Columbines	Red spider
Roses (<u>Rosa</u>)	Garlic, Onions, Chives and Shallots	Black spot mildew and aphids
Rue (<u>Ruta Graveolens</u>)	Roses or Rasp berries	Japanese beetle
Rye (<u>Secale cereale</u>)	Straw berries and onions	Black sport pink root
Sage (<u>Salvia officinalis</u>)	Cabbage, Carrots	White cabbage butterfly, carrot fly
Santolina	-----	Moth repellent
Sassafras (<u>Sassafras albidum</u>)	-----	To trap Codling moth
Savoury, winter (<u>Satureia montano</u>)	-----	Insect repellent

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Scilla Bulbs	-----	To repel rodents
Shepherds purse (<u>Capsella Bursa var pastoris</u>)	-----	To trap mosquito Larv.
Southern wood (<u>Artemisia abrotanum</u>)	Cabbage fruit tree	To prevent moths Cabbage work butterfly
Soyabeans	Corn	Chinch bugs, Japanese beetle
Spear mint	-----	It keeps aphid away from nearby plant, repels ants
Spurge (<u>Euphorbia lathyrus</u> & <u>Elactea</u>)	-----	To repel rats, mouse and moles
Stinging Nettle (<u>Urtica dioica</u>)	-----	It makes neighbouring plants more resistant to lice, slugs and snails
Tansy (<u>Tanacetum vulgare</u>)	a) Peach b) ---	Repels bores It deters fling insects Japanese beetle, cucumber beetle, squash bug
Tea (Leaves)	Radish and carrot seed	Maggots
Thistle (<u>Onicus benedictus</u>)	-----	Insect repellent
Thyme	-----	Cabbage worms
Tobacco <u>Nicotiana tabacccum</u>)	-----	Aphid, whitefly, leafhopper, psylla, thrip and spidermite

Name of the Plant	Name of the plant of allelopathic importance	Used against insects
Tomato (<u>Lycopersicon esculentum</u>)	a) Asparagus	Asparagus beetle
	b) Onion	Red Spider mite
Turnip - Rutabaga (<u>Brassica rapa</u> & <u>B. napobrassica</u>)	-----	Aphids, spider mites and houseflies
White granium	-----	Japanese Beetle
Wormwood	-----	Flea beetle, Black flea beetle, butterfly, Moth and Cabbage worm

Annexure -10

Part : A

Source: Sebastin, M.K. and Bhandari, M.M. "Some Plants Used as Veterinary Medicines by Bhils", International Journal of Tropical Agriculture, Vol. II No.4, PP 307-310, December, 1984.

Scientific name of the plant	Common Name	Used against animal ailments
<i>Abelmoschus moschatus</i>	Bhindi/Jangli	To rejuvenate regurgitation of household animals
<i>Anisomeles indica</i>	Gurba	Antidote to all types of poisons to animals
<i>Capparis decidua</i>	Kareel	Stomach disturbances in animals
<i>Datura stramonium</i>	Daturo	To rejuvenate milking in animals
<i>Dichrostachya cinerea</i>	Imna	Colic in animals
<i>Jatropha gossypifolia</i>	(Ratanjot)	Used for healing of bone fracture in animals
<i>Leptadenia reticulata</i>	Jadajad	Used as a galactagogue for household animals
<i>Zyl... as nummularia</i>	Hon Bor	Root extract is given to animal after calving if uterus comes out
<i>Maytenus emarginata</i>	Willd Vico	Given for ailing animals as a rejuvenator and revitaliser
<i>Mucuna prurita</i>	Kowez	Root paste is applied on the back portion of the neck of bullocks
<i>Nerium indicum</i>	Kaner	Wormicide in animals
<i>Neuracanthus sphaerostachys</i>	Putliyo	Health tonic for animal
<i>Nicotiana tabaccum</i>	Tambaku	As an anthelmintic
<i>Opu... elatior</i>	Papadi ka ke thor	To reduce body pains for animals
<i>Plumbago zeylanica</i>	Chitral	Root paste is applied for skin disease in camel
<i>Tinospora cordifolia</i>	Athervel	Stem paste used for colic pains
<i>Wattakaka vollubilis</i>	Kadbadi	Rejuvenating of regurgitation

Part : B

Source: K.C. Satija "Rural Prescriptions Plea for Search of Scientific Content", Department of Veterinary Sciences, Haryana Agricultural University, Hissar-125004, 22 (2), 111-118 (1987).

Scientific name of the plant	Common Name	Used against animal ailments
<i>Abrus precatorius</i>	Gunja	Nightblindness and fractures
<i>Acacia arabica</i>	Kikkar	Rinderpest
<i>Acorus calamas</i>	Bach	Pica, and Mange
<i>Aesculus indica</i>	-----	Leucorrhoea, and hypoga lactia
<i>Andrographis peniculata</i>	Charayetah	Bite of rabid jackal or dog
<i>Anthocephalus cadamba</i>	Kadamba	Foot and mouth disease
<i>Areca catechu</i>	Supari	Prolapse of vagina
<i>Bambusa arundinaceae</i>	Bans	Retained placenta
<i>Bauhinia purpurea</i>	Khairwal	Haemorrhagic septicaemia
<i>Bergenia ligulata</i>	Pakhanbed	Diarrhoea
<i>Blasmodendron caudatum</i>	Bhainso/Gugal	Rheumatism in camels
<i>Brassica rugosa</i>	Rai	To induce lactation and internal worms
<i>Calotropis gigantea</i>	AK	Kills worms in the ulcers of cattle
<i>Camellia sinensis</i>	Tea	Haemoglobinurea
<i>Capparis horrida</i>	-----	Dropsy
<i>Capsicum annum</i>	Lal mirch	Anoestrus
<i>Citrus aurantifolia</i>	Nibu	Hypogalactia, to increase the quantity of milk, healing of wound
<i>Clerodendrum philomoidis</i>	Arni	Dysentery and Anthrax
<i>Cloroxylon Sweetenia</i>	-----	Wound
<i>Coxylospermum religiosum</i>	-----	Broken limbs of cattle
<i>Crotalaria juncea</i>	Sunn	Drenching pneumonia
<i>Curcuma aromatica</i>	Amhaldi	Lameness due to internal pain Leucorrhoea

Scientific name of the plant	Common Name	Used against animal ailments
<i>Curcuma zedoaria</i>	Kachuri	Colic
<i>Cuscuta reflexa</i>	Amarbela	Inflammation of udder, Lice
<i>Erythrina resupinata</i>	-----	Body pain
<i>Fumaria officinalis</i>	Pipara	Allergy
<i>Cardenia gummifera</i>	Dikmali	Maggor wound
<i>Gardenia turgida</i>	-----	To prevent lachrymation (conjunctivitis)
<i>Geranium aconitifolium</i>	-----	Insect bite
<i>Juglans regia</i>	Akhrot	Lice and ticks
<i>Lawsonia inermis</i>	Mehendi	Prolapse of vagina
<i>Mucana purita</i>	Kawanch	Stomach worms in calves
<i>Nicotiana tabaccum</i>	Tobacco	Colic
<i>Nyctanthes arbortristis</i>	Harshinagar	Internal injurious, to knit broken bones
<i>Orthosiphon rubincundus</i>	-----	Wound healing
<i>Phyllanthus embilica</i>	Jar amla	Convulsions
<i>Piper longum</i>	Piplamul	Prolapse of Vagina
<i>Pongamia pinnata</i>	Karanja	Lamens due to internal pain and Leucorrhoea
<i>Prangos pabularia</i>	-----	To induce milk and indigestion
<i>Prunus persica</i>	Baddam	Eczema
<i>Sapindus emarginatus</i>	Ritha	Wound of vulva
<i>Tribulus alatus</i>	Bhakra	Retention of urine
<i>Vernonia anthelmitica</i>	Kaliziri	Diarrhoea

PURCHASED
 APPROVAL
 GRATIS/EXCHANGE
 PRICE
 ACC NO.
 VIKRAM SARABHAI LIBRARY
 I. I. M. AHMEDABAD