Global food security and the different options available to address the same are the major concerns of the world body. Today, the global population is 5.8 billion, of which over 800 million people do not have enough food and 1.3 billion people live on an income of less than $1 per day. About 50% of the poor live in Asia, 25% in Africa, and 12% in Latin America. Most of the poor people reside in rural areas of developing countries where the ecosystem is fragile. Currently, 80% of the population lives in the developing world and the annual increase in population is 1.9%. Biotic stresses take a heavy toll of the 5 billion tonnes of food currently produced annually. Crop diseases, insect pests and weeds reduce global food production by at least one-third despite the fact that 32 billion dollar worth of pesticides are used on crops annually. Plant diseases alone reduce global food production by more than 10% and the potato disease that caused the Irish famine in 1845 is again becoming prevalent and resulting in significant food losses. In this context, the latest issue of Annual Review of Phytopathology addresses the important issues in plant pathology very effectively consolidating the recent progress and projecting future trends in reducing the crop loss.

The Annual Reviews have always focused on the growing areas of science and this volume too is no exception. There are 21 articles about current advances in basic and applied plant pathology. The preparatory article by J. Artie Browning analyses the need for reseeding the green revolution through the plant health programme that advocates molecular biology to increase yields close to the maximum for food production.

The article on Katherine Esau in the review is praiseworthy. Her work on plant anatomy is unparalleled in botany and work on healthy and infected plant tissues remains classical one. Her bio-

graphy serves as a model for present day botanists and plant pathologists.

This volume is also a textbook covering all aspects of plant pathology ranging from the diseases caused by different micro-organisms to probable futuristic technologies for overcoming plant diseases. While discussing the above, focus has been on the diversity in pathogen isolates, host limitation in pathogen species determination and recent advances in the study of certain economically important diseases. Majority of the chapters describe resistant strategies for plant disease management with specific case studies on general application principles. On the understanding of the mechanisms and the important cascade of events leading to defense in plants, the primary focus is on the conserved nature of signal transduction pathways in broad spectrum and analysis of the defense response between plants and animals. Also, the possible use of new resistance genes of unrelated species for development of resistant transgenic plants is discussed.

An understanding of the mechanisms and important cascade of events leading to defense in plants is essential for plant disease management. Like other Annual Reviews, this issue has also been so vast that it covers all aspects of plant pathology ranging from the diseases caused by viruses, bacteria, fungi and nematodes to probable futuristic technologies to overcome plant diseases. The primary focus in this regard during the last several years has been on resistant signaling and this aspect has also been elaborately discussed by Hutchenson and Gilchrist in their articles. These articles have outlined the conserved nature of signal transduction pathway in broad families of plants and analysed the parallels in the defense response between plants and animals. Also, the possible use of new resistance genes of unrelated species for development of resistant transgenic plants is suggested. Gilchrist has suggested that genes and the signal molecules of programmed cell death in plants helps in understanding the process of development of disease resistance.

New technologies and resources are needed for the development of sustainable crop protection systems by different control strategies against various pests and pathogens that are the important components of the worldwide mission of the Integrated Pest Management Programme. This strategy for the crop production makes the environment less favourable for survival, growth and prolific reproduction of various pest species. This includes replacing susceptible crops from pest hot spots, cultivation to expose soil hidden pests, use of disease-free seeds and plantlets, crop schedules that synchronize with the most inactive period of pest proliferation, destruction of alternative hosts and voluntary hosts, thinning and developing to alter microclimate and nipping the budding pest by pruning to scavenge the field of the already-infested pests. In this context, the article by Barker and Koenning elaborates the historical outlines of the various strategies used for nematode management and their limitations. Recent strategies available for nematode management including the biocutrol, induced systemic resistance by rhizobacteria, nematode identification and assessment of population using the tools of rDNA technology, genetically engineered host resistance and application of ecology and soil biology based cropping management systems are also covered. Though traditional plant breeding for disease resistance is in practice, a revolution in our understanding of the molecular basis of disease resistance has only occurred during the past 5 years as several genetically characterized disease resistance genes for the major classes of plant pathogens have now been cloned and dissected and this is emphasized in the review in a lucid way. The article by Johnson and Stockwell highlights the importance of fire blight in commercialization of pear and apple producers and stresses the importance of increasing population size of the pathogen. The article on 'Systemic resistance induced by rhizospere bacteria' projects newer strategies for induction of resistance in plants with a potential for rhizobacteria to control plant diseases under field conditions. The description of plant health management through the application of mating type genes may help develop technologies for disease management.

The collection of articles in this volume, with a focus on emerging areas, detailed analysis of host-pathogen in-
teraction in plant diseases, role of rhizo-
ospheric organisms in plant health and
appreciation of plant defence strategies
is a relevant publication serving to inte-
grate information available in different
fields. Hence, it is a very important
reference source to researchers in plant
pathology.

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Gene Therapy – Principles and Applica-
tions. Thomas Blankenstein (ed.).
Birkhauser Verlag AG, P.O. Box 133,
CH-4010, Basel, Switzerland. 1999. 392

The hype about gene therapy stems from
the fact that for the first time in medical
history, hope is held out that there could
be a cure for genetic disorders. The pres-
sure from the population that is af-
licted directly or indirectly to share
the burden of a suffering closest kith
and kin, has given a tremendous pur-
pose to pursue this field. The scope of
gene therapy has been broadened to
treat cancers and HIV and infact the
major emphasis in recent years has
shifted to studying cancer therapy using
this approach. The growing clinical
trials have indicated that the major
problems with the approach are in terms
of getting an ideal vector to introduce
the gene followed by optimal and dura-
able expression of the gene product in
the recipient, besides consideration of
safety. While a dramatic success of a
cure is yet to be reported, the informa-
tion made available on the subject is
exploding. Therefore, any book that
gives a comprehensive account of the
field is welcome and the present title
fits the bill.

The book is organized into four major
sections – Gene transfer methods, gene
therapy of single gene defects, gene
marking and gene therapy of cancer.
Each section has several articles written
by different authors working in the
field.

The section on gene transfer methods
encompasses six articles, three on bi-
ological gene transfer and three on physi-
cal approaches to gene targeting.
Retroviral, adenov and recombinant
adeno associated viral (γAAV) vectors
have been described in detail. Despite
the limitation of retroviruses to infect
only dividing cells, these constitute the
most widely used system for ex vivo
gene therapy. A few examples of in
vitro delivery of 'suicide genes' are also
available. Adenovirus can express the
transgene in the nucleus of both repli-
cating and non-replicating cells. Replic-
ation-deficient recombinant adenovirus
 carrying the transgene of choice has
been studied for use in cystic fibrosis,
the Ad2 and Ad5 subtypes having trop-
ism for the lung. More recently, γAAV
is being seriously considered as a future
gene therapy vector. Attempts to obtain
a high titre (3 × 10^11 particles/ml) seem
to be successful and the vector has
unique potential for targeted integra-
tion into the chromosome. Three other
articles deal with liposome and recep-
tor-mediated gene delivery as well as
particle bombardment as another tool.
While these physical methods would be
ideal from safety point of view, in gen-
eral their efficiency of gene transfer is
low.

The section on gene therapy of single
gene defects has four articles covering
information on severe combined immuno
deficiency (SCID), lysosomal storage
disorders, familial hypercholes-
terolemia and cystic fibrosis. Adenosine
deoaminase deficient SCID is the first
genetic disorder to be treated with
retroviral-mediated gene transfer and
the studies have demonstrated the fea-
sibility of introducing functional genes
into peripheral blood lymphocytes and
hematopoietic stem cells to restore nor-
mal immune function in this disease.
The article on lysosomal storage disor-
ders highlights the point that natural
animal models provide a powerful in-
vestigative tool, when the animal pheno-
type closely matches the symptoms in
the human, as is the case with mucol-
polyaccharidosis Type VII in mouse.
However, gene-targetted mouse models
of certain other lysosomal disorders, do
not mimic the human condition, but
manifest changes rendering certain fac-
ets of disease pathology not manifest in
humans. Cystic fibrosis has been the
disease of choice to study the efficacy
of various vector systems and routes of
administration to the airway epithelium.
The results reported in early clinical
trials are equivocal and with several
strategies available for improvement,
the development of therapy protocols is
likely to be incremental. Familial
hypercholesterolemia is due to a defect
in LDL receptor and the first clinical
trial has demonstrated the general fea-
sibility using retroviral-mediated ex vivo
gene transfer.

The section on gene marking consists of
two articles dealing with gene
marking in bone marrow cells, periph-
eral blood cells and T lymphocytes used
in transplantation as well as MDR gene
transfer to hematopoietic cells. Gene
marking studies provide crucial infor-
mation on feasibility, safety and effi-
cacy of genetically modified cells, a
prerequisite for gene therapy trials. The
marker with retroviral vectors as such
does not modify the cells, but allows
them to be detected. The results suggest
that autologous transplanted cells con-
tribute to long-term hematopoiesis. The
marking studies also establish the con-
tribution of unpurged autologous bone
marrow to disease relapse following
bone marrow transplantation. The lym-
phocytic target cells for gene marking
include tumour infiltrating lymphocytes
(TILS), virus specific cytotoxic T cells
and donor derived lymphocytes. MDR1
gene transfer studies have shown that
the expression of P-glycoprotein in
hematopoietic tissues can protect progeni-
tor cells from cytotoxicity of anticancer
drugs. Transformed cells have a selec-
tive advantage over non-transformed
cells in terms of protecting bone marrow
cells from myelosuppression following
chemotherapy. The approach permits to
introduce and over-express otherwise
non-selectable genes that can correct
genetic disorders.

The section on gene therapy of cancer
has eight articles. The first one elabo-
rates on antisense oligonucleotide ther-
apy using c-myc proto-oncogene as the
target. The article on thymidine kinases
discusses the prospects of tk-mediated
'suicide' gene therapy. Tumour cells
transduced with HSVtk become sensi-
tive to Gancyclovir and the approach
has attracted attention in view of the
'Bystander' effect. The characterization
of tumour associated antigens, the