ANNUAL REPORT OF THE

BEAN IMPROVEMENT

COOPERATIVE

A VOLUNTARY AND INFORMAL ORGANIZATION
TO EFFECT THE EXCHANGE OF INFORMATION AND MATERIALS
REPORT OF THE
BEAN IMPROVEMENT COOPERATIVE

No. 14 March 1971

Coordinating Committee: Carroll G. Briggs
L. L. Dean
I. L. Jorgensen
L. A. Polzak
W. J. Zaumeyer
D. P. Coyne, Chairman

Please address correspondence about BIC membership and BIC annual reports to;
D. P. Coyne, Department of Horticulture and Forestry, University of Nebraska,
Lincoln, Nebraska 68503

Note: None of the information contained in the research notes of this report may be used in publications without the consent of the respective authors. Please correspond with the authors concerned.
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourteenth Annual Report</td>
<td>of the Bean Improvement Cooperative</td>
<td>1</td>
</tr>
<tr>
<td>News Notes</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Invitational Papers</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Some Morphological and Physiological Effects of Air Pollutants on Bean Growth</td>
<td>Barbara D. Webster</td>
<td>6</td>
</tr>
<tr>
<td>New Seed Combine Progress Report</td>
<td>Leonard M. Klein</td>
<td>10</td>
</tr>
<tr>
<td>Predicting Seed Longevity</td>
<td>Charles E. Vaughan</td>
<td>13</td>
</tr>
<tr>
<td>Is There a Better Way Than Percent Germination</td>
<td>L. W. Woodstock</td>
<td>17</td>
</tr>
<tr>
<td>Research Notes</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Unexpected Usefulness of Some Selections</td>
<td>M. L. Anderson</td>
<td>19</td>
</tr>
<tr>
<td>Disease Reaction of Bean Varieties to Xanthomonas phaseoli and Xanthomonas phaseoli var. Fuscans Bacteria using Two Inoculation Methods</td>
<td>Gregory Arp, D. P. Coyne, and M. L. Schuster</td>
<td>20</td>
</tr>
<tr>
<td>Seasonal Pattern of Root Rot Development in Resistant and Susceptible Varieties</td>
<td>J. R. Baggett and W. A. Frazier</td>
<td>21</td>
</tr>
<tr>
<td>General Resistance in Beans, with Particular Reference to Curly Top, Summer Death and Clover Stunt</td>
<td>Barbara Ballantyne</td>
<td>21</td>
</tr>
<tr>
<td>Control of Bean Root Rot by Loosening the Soil</td>
<td>D. W. Burke and D. E. Miller</td>
<td>24</td>
</tr>
<tr>
<td>Factors Affecting Time of Flowering of California Small White and a Breeding Program to Develop an Early Variety</td>
<td>Dermot P. Coyne</td>
<td>25</td>
</tr>
<tr>
<td>Effect of Common Blight Disease on the Performance of Great Northern Varieties and Breeding Lines</td>
<td>D. P. Coyne and M. L. Schuster</td>
<td>26</td>
</tr>
<tr>
<td>Small Leaved Compact Bush Beans</td>
<td>M. H. Dickson and S. Shannon</td>
<td>27</td>
</tr>
<tr>
<td>The Use of ARG Gene as a Means to Improve Wax Beans</td>
<td>M. H. Dickson and S. Shannon</td>
<td>30</td>
</tr>
<tr>
<td>Bean Plant Introductions</td>
<td>Desmond D. Dolan</td>
<td>30</td>
</tr>
<tr>
<td>Field Resistance to Bean Yellow Mosaic</td>
<td>W. A. Frazier and J. R. Baggett</td>
<td>31</td>
</tr>
<tr>
<td>Low Dosage Neutron Radiation of Bean Seed Prior to Planting</td>
<td>W. A. Frazier</td>
<td>34</td>
</tr>
<tr>
<td>Root Rot Resistance</td>
<td>W. A. Frazier and J. R. Baggett</td>
<td>35</td>
</tr>
<tr>
<td>Split Set in Bush Beans</td>
<td>W. A. Frazier</td>
<td>36</td>
</tr>
<tr>
<td>Differential Response Among Bean Varieties to Nitrogen and Phosphorus</td>
<td>Wayne L. Haag, M. Wayne Adams, and Antonio M. Pinchinat</td>
<td>38</td>
</tr>
</tbody>
</table>
Corbett Refugee and Other Sources of Resistance to Bean Common Mosaic——N. Hubbeling. .......................... 39
Introduction of the Great Northern Dry Bean——Leland W. Hudson. ...................................................... 40
Investigation of the Influence of the Gamma Rays on the Dry Beans Phaseolus vulgaris L.—Dr. Biserka Ilieva—Staneva ................................................................. 41
Fusarium Root Rot of Beans——J. M. Kraft and D. W. Burke. .......... 43
Hard Seed Studies of Dry and Snap Beans——Jack H. Kyle ........... 43
Dry Bean Disease Nursery——1970——Jack H. Kyle ..................... 44
Progress Report on "Lunastachyus" Amphidiploid Derivatives from P. lunatus x P. polystachyus——A. P. Lorz. ............... 46
Control of Fusarium Root Rot of Beans by In-furrow Fungicide Sprays——J. J. Natti. ........................................... 47
Inheritance Within the Yellow-Black Seedcoat Colour Group of Phaseolus vulgaris L.—R. Prakken .......................... 49
Halo Blight Resistant Line——P. I. Pryke .............................. 52
Severe Sclerotinia Epidemic——P. I. Pryke .............................. 52
Seedling Injection as an Aid in Identifying Bean Blight Bacteria——A. W. Saettler ........................................... 53
Chemical Sprays for the Control of Common-Fuscose Bacterial Blight in Navy(pea) Beans——A. W. Saettler. ............... 54
A New Strain of Xanthomonas phaseoli——M. L. Schuster and D. P. Coyne. ................................................... 56
Differential Response of Two Navy Bean Varieties (Phaseolus vulgaris L.) to Zinc——R. G. Shellenberger and M. Wayne Adams. ................................................... 56
Curly Top Virus Screening Service for Snap Bean Breeders——M. J. Silbernagel. ........................................... 59
Evaluation of Fungicide Seed Treatments for Control of Bean Root Rot——J. R. Steadman and E. D. Kerr ..................... 59
Evaluation of Breeding Lines for Root Rot Resistance at Scottsbluff——J. R. Steadman and D. P. Coyne. ............... 60
A Proposal for Overcoming the Yield-dampening Effects of Component Compensation in Field Beans——Oswaldo Voysest and M. Wayne Adams ........... 61
Experimental Introgression in the Genus Phaseolus, I. Effect of Mating Systems on Interspecific Gene Flow——J. R. Wall. .......................................... 63
Promising Baby Limas——R. E. Wester .............................. 64
Promising Fordhook Limas——R. E. Wester ........................... 65
Stocks for Exchange .......................................................... 66
Stocks Desired .................................................................. 66
List of Members ................................................................ 68
Bibliography .................................................................. 81
Additional Research Notes .................................................. 107
The Behaviour of the Amphidiploid (Phaseolus vulgaris L. x Ph. coccineus L.) in Backcrosses——N. Haq and J. Smartt. ... 107
Some Thoughts on Interspecific Hybridization in Phaseolus——J. Smartt. ...................................................... 109
Financial Statement ......................................................... 112
FOURTEENTH ANNUAL REPORT OF THE BEAN IMPROVEMENT COOPERATIVE

I wish to thank all those who submitted research notes and other important and useful information for the 1971 BIG annual report. I also wish to express thanks to those people who submitted invitational papers. The majority of these particular papers were presented at the 1970 BIG meeting in Seattle. Dr. Matt Silbernagel was program chairman at that meeting and he asked speakers to prepare a summary of their talks for publication in the BIG annual report. These summaries will be useful to members who were not able to attend the last BIG meeting.

I appreciate the assistance of several people who prepared the extensive bibliography published in this year's report. Dr. D. W. Burke, USDA, APS, Prosser, Washington, compiled the bibliography in the areas of plant pathology and entomology. Dr. Roger F. Sandsted, Mr. H. Chris Wien, Mr. Paul A. Hughes, Mr. Romeo R. Martinez, and Dr. Donald Wallace, Cornell University, Ithaca, New York, compiled the bibliography in the areas of culture, physiology, and quality of beans. Dr. Harry Mack, Oregon State University, and Dr. Art Sprague, Del Monte Corporation, also submitted an extensive list of references in this general area. Gregory Arp, University of Nebraska, compiled much of the bibliography in the area of breeding and genetics.

Mrs. Jean Arp typed the entire report this year and her husband Greg also assisted in the preparation of the report in numerous ways. I am grateful for their cheerful and diligent cooperation.

The next BIG meeting will be held in Milwaukee, Wisconsin, on November 9, 1971. Dr. F. A. Bliss, Department of Horticulture, University of Wisconsin, Madison, Wisconsin 53715, is program chairman for this
meeting. If you wish to make suggestions concerning topics and subjects to be considered for presentation at this meeting please write to Dr. Bliss in the fairly near future.

For the Coordinating Committee

Dermot P. Coyne

Dermot P. Coyne
NEXT BIENNIAL BIG MEETING

Fred Bliss, BIC Program Chairman
Department of Horticulture, University of Wisconsin
Madison, Wisconsin

The next BIC meeting will be held November 9, 1971 at the Sheraton-Schroeder Hotel, Milwaukee, Wisconsin, preceding the convention of the Wisconsin Carvers and Freezers. Suggestions and information regarding the program are welcome and should be sent to Fred Bliss, Department of Horticulture, University of Wisconsin, Madison, Wisconsin 53706, or to other members of the program committee: Carroll Briggs, Shig Honma, C. Lamborn, L. A. Polzak, A. P. Sprague.

********

COOPERATIVE DRY BEAN NURSERIES

Marshall LeBaron
University of Idaho
Kimberly, Idaho

We have a bean nursery program that is a cooperative effort among experiment stations in the west and mid-west who are interested in dry bean production. Our objective is to test new varieties and strains of beans that are genetically fixed and have been proven adapted to a limited area of production. The nursery gives us all an opportunity to determine a greater area of adaptation for our new materials and to become better acquainted with potential new varieties that may be released by other stations.

The Idaho station has, for the last several years, collected entries from stations and redistributed them among cooperators to assure uniform seed stock to all. We compile the data into a simple report of yield and maturity, with special comments from the operators of the nursery included.

Presently the cooperating stations include:
Prosser, Washington
Twin Falls, Idaho
Sidney, Montana
Powell & Torrington, Wyoming
Rosemount, Minnesota
Greeley, Colorado
Farmington, New Mexico
Scotts Bluff & North Platte, Nebraska
Tribune & Garden City, Kansas
If other stations who are involved with dry bean breeding and culture are interested we may well be able to expand the program. The quantity of seed needed now for a new entry is about twenty-five pounds, and this might become a problem if we became too large. We welcome comments.

********

REQUEST FOR SEED OF BEAN LINES

RESISTANT OR TOLERANT TO BACTERIAL DISEASES

J. Guthrie
Plant Science, University of Idaho
Moscow, Idaho 83843

Members of BIC:
I have received a few samples of bacterial blight (halo, syringae or common) resistant (tolerant) bean seed but hope that I might obtain more. I have been making amino acid analyses of the leaves and pods in hope to find out if there is a relationship between these fractions and disease tolerance. If you have sources of tolerance to these blights I would appreciate small seed samples for my tests.

********

P.G.R.O. PEA AND BEAN GROWING HANDBOOKS

A. J. Gane, Director of Research
Pea Growing Research Organisation Ltd.
The Research Station, Great North Road
Thornhaugh, Peterborough, England

Production of this limited edition is planned to commence early in 1971, and we are now gathering together estimates of likely circulation.

The Handbooks are described briefly in the attached notes, and our present expectation is a price in the region of £2 per volume. Price will, however, be affected by sales, and will be reduced if possible, as this project is not aimed at profit-making.

We should be most grateful for any help you are able to give us in estimating what sales there might be, if any, in the United States.

Editor's note: I received this request from A. J. Gane. If you are interested in receiving these handbooks, please write directly to Allan Gane.

********
HONORS RECEIVED BY BIG MEMBERS DURING PAST YEAR

Dr. Warren H. Gabelman, Professor and Chairman, Department of Horticulture, University of Wisconsin, Madison, Wisconsin, was elected a fellow of the American Society for Horticultural Science during the annual meeting of the Society, November 3, 1970, at the Carillon Hotel, Miami Beach, Florida. Dr. Gabelman received this high honor in recognition for his excellent research contributions in vegetable crop breeding and genetics and his ability as a teacher.

A distinguished bean breeder Dr. Donald H. Wallace, Professor, and Dr. M. E. Nasrallah, former graduate student, Cornell University, Ithaca, New York, received the 1970 AIES - Campbell Award for their outstanding research on immunogenetic studies of incompatibility in Brassica. The award consisted of a bronze medal for each recipient and a $1500 prize.

Dr. Bruce M. Pollock and Dr. Joseph R. Manalo, Agricultural Research Service, USDA, Fort Collins, Colorado, received the American Society for Horticultural Science "Asgrow Award" for the best paper on genetic and biological factors affecting production and handling of vegetable crops (Donor: Asgrow Seed Company, Orange, Connecticut) for their paper in the Jour. Amer. Soc. Hort. Sci., Vol. 94 (b) entitled "Controlling substrate moisture - oxygen levels during the imbibition stage of germination".

Dr. David W. Davis was named an associate editor of Hort. Science.
STOCKS FOR EXCHANGE

Mrs. A. Harsanyi
Vegetable Department
Budapest, XXII Park U2, Hungary

Hungarian yellow and green podded snap bean varieties

P. I. Pryke
Plant Breeding Branch
Dept. of Agriculture
Burnley Gardens
Swan Street
Burnley, Victoria, Australia

Seed of 68/779.
Stringless, resistant to Halo Blight and "Summer Death"

W. Vreeken
Vreeken's Zaden
Dordrecht, Holland

7/70/349 Bush bean with genetical fascination
8/70/359 Bush Bean (Cocc. x lunatus) with much cross pollination, high grade tol. Pseudomonas phas.
10/70/126 virus and coll. res.
11/70/135 flowering on top, coll. res.
12/70/148 coll. res. with high grade virus tol.
15/70/687 strong for wind damage

STOCKS DESIRED

Mark J. Basset
Dept. of Vegetable Crops
Univ. of Florida
3026 McCarty Hall
Gainesville, Florida 32601

1. Stocks which have pods with little or no hair.
2. Andean bean cultivars which are adopted to the extreme cold of the Altiplano

Sources of resistance/or tolerance to virus diseases, halo blight, and anthracnose

Mrs. A. Harsanyi
Vegetable Department
Budapest, XXII Park U2, Hungary

Lines with resistance or low susceptibility to Sclerotinia.
W. Vreeken
Vreeken's Zaden
Dordrecht, Holland

Oswaldo Voyest V.
Estacion Experimental Agricola
La Molina
Apartado 2791
Lima, Peru

Bush bean with dark green pods and small seeds.
Bush beans with high resistance and deep yellow pods.
Bush beans highly res. especially for Pseudomonas var.
Bush beans with res. to Fusarium.

Lines with resistance or tolerance to rust, common bean mosaic or nematodes.
Names of members are maintained in this list for two years, even though dues have not been paid. Annual reports are sent to members only when current dues are paid.

Adams, M., Curtice-Burns, Inc., 315 Alexander Street, P. O. Box 681, Rochester, New York 14607

Adams, M. W., Michigan State University, Department of Crop and Soil Sciences, East Lansing, Michigan 48823

Agenbroad, O. D., Green Giant Co., Dayton, Washington 99328

Alvarez, Luna, Eduardo, Director Tecnico, Km 0 Carretera A Navolato, Apartado 229, Simientes Mexicanas, S. A., Culiacan, Sinaloa, Mexico

Anderson, Axel L., Department of Botany and Plant Pathology, Michigan State University, East Lansing, Michigan 48823

Anderson, M. E., Rogers Bros. Seed Co., Box 2188, Twin Falls, Idaho 83301

Andeweg, J. M., Breeding Station, Royal Sluis, 31, Afweg, Wageningen, Holland

Asmer Seeds Ltd., Attention: Dr. Holland, P. O. Box No. 33, 33 Moor Street, Ormskirk, Lancs, England

Atkin, John D., Research Department, Asgrow Seed Co., P. O. Box 1235, Twin Falls, Idaho 83301

Aylesworth, J. W., Canada Department of Agriculture, Research Station, Harrow, Ontario, Canada

Baggett, J. R., Department of Horticulture, Oregon State University, Corvallis, Oregon, 97331

Ballantyne, Barbara, Biological and Chemical Research Institute, Biology Branch, Department of Agriculture, Private Bag No. 10, Rydalmere, New South Wales, 2116, Australia

Barrios, Ing. Agr. Alfredo, Centro de Investigaciones Agronomicas, Seccion de Fitotecnia, Maracay, Edo, Aragua, Venezuela

Bartz, H. M., Mitchell, Nebraska 69357

Bliss, F. A., Department of Horticulture, University of Wisconsin, Madison, Wisconsin 53715

Bouwkamp, John C., Department of Horticulture, University of Maryland, College Park, Maryland 20742
Bradbeer, J. W., Botany Department, University of London King's College, School of Biological Sciences, 68 Half Moon Lane, London, S. E. 24., England

Brewer, John V., 2625 No. Union St., Appleton, Wisconsin 54911

Boucard, Gerard, Societe Anonyme Darbouco, 87, Rue Du Quai, P. O. Box 4, Port - Au - Prince, Haiti

Briggs, Carroll G., Asgrow Seed Co., P. O. Box 6, Milpitas, California 95035

Brotherton, Harley, W. Brotherton Seed Co., Inc., P. O. Box 906, Moses Lake, Washington 98837

Brucher, Ollie, Apart Add Postal 10098, Departamento de Bioquimica, Escuela de Biologia, Facultad de Ciencias, Universidad Central de Venezuela, Caracas, Venezuela

Brooks, Jim, Razor Back Farms, Inc., Springdale, Arkansas 72764

Burke, Douglas W., USDA, ARS, Crops Research Division, Irrigated Agriculture Research and Extension Center, Prosser, Washington 99350

Burpee, W. Atlee III, Vice President, W. Atlee Burpee Co., Hunting Park Ave. at 18th St., Philadelphia, Pennsylvania 19132

Camacho, Luis H., Head, Grain Legumes Program, Instituto Colombiano, Agropecuario, Centro Nacional de Investigaciones Agropecuarias, Palmira, Colombia, South America

Campbell, John A., Truck Crops Experiment Station, Crystal Springs, Mississippi 39059

Campbell's Soups, Ltd., Kings Lynn, Norfolk, England

Carlin, K., The Golden Circle Cannery, Earnshaw Road, Northgate, Brisbane, Queensland, Australia

Cassidy, J. C., The Agricultural Institute, Horticulture and Forestry Division, Kinsealy, Malahide Road, Dublin 5, Ireland

Chester B. Brown Co., Morrill, Nebraska 69358

Chung, Jai H., Crop Research Division, DSIR, Lincoln, Christ Church, New Zealand

Clark, G. H., Experimental Farm, Harrow, Ontario, Canada

Colville, Robert B., Del Monte Corporation, P. O. Box 89, Rochelle, Illinois 61068
Cosgriff, P. W., Pict Limited, Box 46, P. O., Mt. Waverley, Vic. 3149 Australia

Counter, Ben F., Fort Lupton Canning Co., Fort Lupton, Colorado 80621

Coyne, Dermot P., University of Nebraska, Department of Horticulture and Forestry, Lincoln, Nebraska 68503

Crites-Moscow Growers, Inc., Moscow, Idaho 83843

 Crosby, E. A., National Canners Association, 1133 - 20th Street N. W., Washington, D. C. 20036

Curme, John H., Agricultural Research Department, Green Giant Co., Le Sueur, Minnesota 56058

D. Van Der Ploeg's, Elite Zaden N. V., Zaadteelt and Zaadhandel, N. V., Barendrecht, Holland

Davis, David, Department of Horticulture, University of Minnesota, St. Paul, Minnesota 55101

Davison, Arlen D., Western Washington Research & Extension Center, Puyallup, Washington 98371

Deakin, John R., USDA Vegetable Breeding Laboratory, Box 33448, Charleston, South Carolina 29407

Dean, L. L., University of Idaho, Bean Research Lab., Box 67, Twin Falls, Idaho 83301

Department of Science Services, Department of Agriculture, Rydalmere, New South Wales 2116, Australia Attention: Librarian

Dickens, L. E., Department of Plant Pathology, Colorado State University, Fort Collins, Colorado 80521

Dickson, M. H., Agricultural Experiment Station, Department Vegetable Crops, Geneva, New York 14456

Dolan, D. D., Room 220 Sturtevant Hall, Plant Introduction Station, New York Agricultural Experiment Station, Geneva, New York 14456

Dongo, Segundo L., Departamento de Fitopatologia, Est Acion Experimental Agricola de La Molina, Apartado 2791, Lima, Peru

Drijfhout, E., Institute for Horticultural Plant Breeding, P. O. Box 16, Wageningen, Netherlands

Director, Crop Research Division, DSIR Private Bag, Christ Church, New Zealand
Echandi, Eddie, Co-leader National Bean Program, North Carolina State University Mission, U. S. Embassy, USAID, Lima, Peru

Fisa, Hamdy M., University of Arizona, Environmental Research Laboratory, Tucson International Airport, Tucson, Arizona 85706

Emery, G. C., Ferry-Morse Seed Co., San Juan Bautista, California 95045

Ensignment, Ronald, University of Idaho, Agricultural Experiment Station, Moscow, Idaho 83844

Evans, Alice, School of Agriculture, University of Cambridge, Downing Street, Cambridge, England

Farlow, P. J., Department of Primary Industries, Redlands Horticultural Research Station, Delancey Street, Ormiston, Queensland, 4163, Australia

Fenton, Allen, Green Giant Company, Watsonville, California 95076

Fisher, Vernon J., 8 Oaknoll Road, Wilmington, Delaware 19808

Frappell, B. D., Department of Agriculture, P. O. Box 303, Devonport, Tasmania 7310

Frazier, W. A., Oregon State College, Department of Horticulture, Corvallis, Oregon 97331

Frozo Food Company Pty, Ltd., Attention: G. C. Grantham, Cr. Cherry Lane and Maria St., Brooklyn, Victoria, Australia

Gabelman, W. H., Horticulture Department, University of Wisconsin, Madison, Wisconsin 53715

Gamez, Rodrigo, Departamento de Fitopatologia, Universidad de Costa Rica, Ciudad Universitaria, Costa Rica

General Foods Corporation, Attention: M. W. Miller, Birds Eye Division, County House Road - RFD 3, Albion, New York 14401

Gonzales, J. A., Centro de Investigaciones Agronomicas, Sec de Fitopatologia, Maracay, Venezuela, South America

Gordon Edgell Pty. Ltd., Head Office Agriculture, P. O. Box 56, Bathurst 2795, New South Wales, Australia

Green Giant Company, Attention: J. G. Martland, Agricultural Research Department, Le Sueur, Minnesota 56058

Guazzelli, Richardo Jose, Estacao Experimental do Morada, Caixa Postal 57, Uberaba, Minas Gerais, Brazil
Guthrie, James W., Department of Plant Sciences, University of Idaho, Moscow, Idaho 83843

Hagedorn, Don, University of Wisconsin, Department Plant Pathology, Madison, Wisconsin 53706

Harsányi, A., Vegetable Department, Horticultural Research Institute, Budapest, XXII Park U2, Hungary

Hartmann, Richard W., Department of Horticulture, 3190 Maile Way, Room 102, University of Hawaii, Honolulu, Hawaii 96822

Haws, C. L., Del Monte Corporation, California Division, 2600 - 7th Street, Berkeley, California 94710

Hepler, R. W., Department of Horticulture, Pennsylvania State University, 101 Tyson Building, University Park, Pennsylvania 16802

Hickey, Joseph C., Burnham and Morrill Company, P. O. Box 1871, Portland, Maine, 04104

Hikida, H. R., Campbell Soup Co., Riverton Laboratory, Branch Pike, Riverton, New Jersey 08077

Hollis, William, National Canners Association, 1133 - 20th Street North West, Washington, D. C., 20036

Honma, Shigemi, Department of Horticulture, Michigan State University, East Lansing, Michigan 48823

Hornby, C. A., Division Plant Science, University of British Columbia, Vancouver, B, British Columbia Canada

Horticultural Research Institute of Ontario, Department of Agriculture and Food, Vineland Station, Ontario, Canada

Hrabá, A. R., FMC Corporation, Niagara Chemical Division, P. O. Box 601, Yakima, Washington 98901

Hubbeling, Ir. N., Instituut voor Plantenziektenkundig Onderzoek, Wageningen, Netherlands

Hudson, Leland W., USDA, ARS, Rm. 59, Johnson Hall, Pullman, Washington 99163

Huffington, Jess M., 600 Debaugh Avenue, Towson, Maryland 21204

Hung, Lih, Department of Horticulture, College of Agriculture, National Taiwan University, Taipei, Taiwan, Republic of China

Hunts Canning Co., Pty. Ltd., Attention: Mr. J. A. Skipsey, 53 Mount Street, Perth, Western Australia, Australia 6000
Idaho Bean Commission, State House, Room 206, Boise, Idaho 83702

Institute of Agronomy, Caixa Postal 28, Campinas, Est. S. Paulo, Brazil, South America

Inter-American Institute of Agricultural Sciences, Library and Documentation Service, Turrialba, Costa Rica

Intermountain Bean Co., Inc., Box 805, Twin Falls, Idaho 83301

Jaffe, Werner G., Apartado 20149, Caracas, Venezuela

Jørgensen, I. L., 1500 Jackson St., NE., Northrup-King Co., Minneapolis, Minnesota 55413

Jørgensen, M. Almigstrup, Danish State Exp. Hort, Station, Spangsbjerg Kirkevej 41, Esbjerg, Denmark

Joseph Harris Co., Inc., Moreton Farm, Rochester, New York 14624

Kaplan, L., Department of Biology, University of Massachusetts, 100 Arlington Street, Boston, Massachusetts 02116

Kelly, J. F., Vice President, Pioneer Research, Campbell Institute for Agricultural Research, Riverton, New Jersey 08077

Kiely, T. F., Charter Seed Company, Box 191 Twin Falls, Idaho 83301

Kinbacher, Edward J., Department of Horticulture and Forestry, University of Nebraska, Lincoln, Nebraska 68503

Kluber, John, FMC Corporation, Niagara Chemical Division, Box 3091, Modesto, California 95353

Kolar, John J., Bean Research Laboratory, Box 67, University of Idaho, Twin Falls, Idaho 83301

Kovachick, W., Unilever Research Laboratory, Colworth/Welwyn, Colworth House, Sharnbrook, Bedford, England

Kurzenhauser, J. W., 905 John Adams Parkway, Idaho Falls, Idaho 83401

Kyle, Jack H., Garden City Branch Station, Kansas State University, Garden City, Kansas 67846

Lamborn, Calvin R., Gallatin Valley Seed Co., Box 167, Twin Falls, Idaho 83301

Lawyer, L. O., Del Monte Corporation, 850 Thornton Street, San Leandro, California 94577

Leakey, Colin L. A., Makerere University College, P. O. Box 7062, Kampala, Uganda
LeBaron, Marshall, Branch Expt. Station, Route 1, Kimberly, Idaho 83341

Les Graines Caillard, Ets Caillard et Quris, 35 A 41 Rue Du Petit-Thouars, 8 A 12 Rue Du Clon, Angers France

Librarian, Agricultural Experiment Station, P. O. Box "H", Rio Piedras, Puerto Rico 00928

Librarian, Canada Department of Agriculture, Research Branch, Research Station, Harrow, Ontario, Canada

Librarian, Department of Agriculture, P. O. Box 2298, USS O:207, Wellington, New Zealand

Lorz, A. P., University of Florida, Department of Vegetable Crops, Gainesville, Florida 32601

Lunn, Vibe, Institute of Seed Pathology for Developing Countries, 78, Ryvangsalle Hellerup, Copenhagen, Denmark

Mack, Harry J., Horticulture Department, Oregon State University, Corvallis, Oregon 97331

MacKellar, L. D., P. O. Box 2109, Portland, Oregon 97214

Magoun, John A., FMC Corporation, Niagara Chemical Division, Middleport, New York 14105

Markarian, D., Curtice-Burns, Inc., 360 East Avenue, P. O. Box 670, Rochester, New York 14602

Martinez, Romeo, Department of Vegetable Crops, Cornell University, Ithaca, New York 14850

Matheson, James A., Agway Inc., Box 336, Prospect, Pennsylvania 16052

Mauth, H. M., Rogers Bros. Seed Co., P. O. Box 2188, Idaho Falls, Idaho 83401

Mayer, L. E., Stokely-Van Camp Inc., 941 North Meridian, Indianapolis, Indiana 46206

Meader, E. M., P O. Box 515, Rochester, New Hampshire 03867

Meiners, Jack P., USDA, ARS, Crops Research Division, Beltsville, Maryland 20705

Merck and Co., Inc., Rahway, New Jersey 07065

Minion, G. D., Del Monte Corporation, Agricultural Res. Department, 850 Thornton Street, San Leandro, California 94577
Miranda, Heleodoro M., IICA, Zona Norte, Apartado 1815, Guatemala, Guatemala

Moh, Carl C., I. I. C. A., Centro Ensenanza e Investigacion, Turrialba, Costa Rica

Moldenhauer, Robert T., Asgrow Seed Company, Filer, Idaho 83328

Montoya, Jose L., Ministerio de Agricultura, Instituto Nacional de Investigaciones Agronomicas, Centro de Cerealicultura, Avda Puerta de Hierro, Madrid 3, Spain

Morris, John, Rogers Bros. Seed Co., P. O. Box 104, Twin Falls, Idaho 83301

Muehauer, J. K., Department of Agriculture and Food, Western Ontario Agricultural School and Experimental Farm, Ridgetown, Ontario, Canada

Mughogho, L. K., Bunda College of Agriculture, University of Malawi, P. O. Box 219, Lilongwe, Malawi

Munger, H. M., Department of Plant Breeding and Biometry, Cornell University, Ithaca, New York 14850

Mc Anelly, Charles W., Department of Plant Science, University of Wyoming, Laramie, Wyoming 82070

Mc Cabe, John, Ferry-Morse Seed Company, P. O. Box 8, San Juan Bautista, California 95045


Natti, John F., Cornell University, New York Agricultural Experiment Station, Geneva, New York 14456

Nishi, Sadao, Hiratsuka Kawagawa, Japan

Nunhem, N. V., Nunhems Zaden, Kasteel Nunhem, Haelen, Holland

Ormrod, Douglas F., Chairman, Department of Horticulture, Ontario Agricultural College, University of Guelph, Guelph, Ontario, Canada

Orozco, Silvio H., Granja Agrícola, Palmira, Colombia, South America

Oshima, N., Department of Botany and Plant Pathology, Colorado State University, Fort Collins, Colorado 80521

Parker, M. C., Gallatin Valley Seed Company, Box 161, Twin Falls, Idaho 83301
Pea Growing Research Organization, Ltd., The Research Station, Great North Road, Thornhaugh, Peterborough, England

Pearson, O. H., Department of Plant Breeding and Biometry, Cornell University, Ithaca, New York 14850

Peck, Nathan H., Department Vegetable Crops, Agricultural Experiment Station, Geneva, New York 14456

Pierce, W. H., Asgrow Research Center, P. O. Box 793, Twin Falls, Idaho 83301

Pinchinat, A., Instituto Interamericana de Ciencias, Agrícolas de la Oea, Centro de Ensenanza e Investigacion, Turrialba, Costa Rica


Prakken, R., Department of Genetics, Agricultural University, 53 General Foulkesweg, Wageningen, the Nederlands

Prasad, Krishna, Department of Horticulture, Iowa State University, Ames, Iowa 50010

Provvidenti, R., Department of Plant Pathology, New York State Agricultural Experiment Station, Cornell University, Geneva, New York 14456

Pryke, P. I., 8 Zander Avenue, Nunawading 3131, Victoria, Australia

Quinones, F. A., Department of Agronomy, New Mexico State University, P. O. Box 3 Q, Las Cruces, New Mexico 88001

Redfern, Tony, Scottish Horticultural Research Institute, Invergowrie, Dundee, Scotland

Robinson, B. F., 1318 Fremont Drive, Twin Falls, Idaho 83301

Robinson, L. R., Jr., FMC Corporation, Niagara Chemical Division, Box 3091, Modesto, California 95353

Royal Sluis, Koninkijke Zaaizaadbedrijven, Gebroeders Sluis N. V., Postbox 22, Enkhuizen, Holland

Rumsey's Seeds Pty., Attention: Manager, Post Office Box 201, Ayr, Queensland, Australia 4807

Ruiz-Fornells, Rafael, Instituto Nacional de Investigaciones Agronomicas, Centro de Cerealicultura, Avada Puerta de Hierro, Madrid 3, Spain

Rumsey's Seeds Pty. Ltd., Attention: Mr. Gordon C. Smith, Director, P. O. Box 215, Parramatta, New South Wales 2150, Australia
Saettler, A. W., Department Botany and Plant Pathology, Michigan State University, East Lansing, Michigan 48823

Salamini, Francesco, Experiment Institute of Vegetable Crops, 20075 Montanasco Lombardo, Milano, Italy

Sanchez, Roland L., 18550 Overlook Road, Los Gatos, California 95030

Sandsted, R. F., Department Vegetable Crops, Cornell University, Ithaca, New York 14850

Schröder, Robert H., FMC Corporation, Niagara Chemical Division, 2650 San Juan Hiway, San Juan Bautista, California 95045

Schröder, W. T., Department of Plant Pathology, New York State Agricultural Experiment Station, Geneva, New York 14456

Schroth, Milton N., Department of Plant Pathology, University of California, Berkeley, California 94720

Schulbach, Roy, 3254 Center Street NE, Salem, Oregon 97301

Schulz, Paul E., Agricultural Research Center, Libby, McNeill, and Libby, Read Road, Rt. 3, Janesville, Wisconsin 53545

Scotts Bluff Station, Attention: Frank Anderson, Lionel Harris, David Nuland, University of Nebraska, Mitchell, Nebraska 69375

Serials Department, University of California, General Library, Berkeley, California 94720

Sheldon, A. K., Curtice-Burns Inc., 360 East Avenue, P. O. Box 670, Rochester, New York 14602

Sheperd, D. G., Department of Primary Industries, Redlands Horticultural Research Station, Delancey Street, Ormiston, Queensland, 4163, Australia

Silbernagel, Matt J., USDA, ARS, Irrigation Experiment Station, Prosser, Washington 99350

Sluis and Groot, Koninklijke, Zaadteelt en Zaadhandel, Enkhuizen, Holland

Smartt, J., Department of Botany, The University, Southampton, S09 5 NH, England

Smedley's Ltd., Attention: M. O'Keefe, Lynn Road, Wisbech, Norfolk, England

Smith, Stuart N., Sweet Corn Genetic Service, 808 E. Lincoln Way, Ames, Iowa 50010

Sneddon, J. L., Variety Classification Unit, Huntington Road, Cambridge, England
Snyder, W., Department of Plant Pathology, University of California, Berkeley, California 94720

Sprague, A. P., Del Monte Corporation, 850 Thornton Street, San Leandro, California 94577

Starke-Ayres & Co., Ltd., Attention: Mr. W. E. Kerr, Technical Director, 13-17 Main Road, Mowbray, C. P. South Africa

Station Centrale D'Amélioration, Des Plantes, C. N. R. A. - Route de Saint-Cyr., 78 - Versailles, France

Stayton Canning Co. Co-op., Stayton, Oregon 97383

Steadman, James R., Department of Plant Pathology, University of Nebraska, Lincoln, Nebraska 68503

Stokely-Van Camp Inc., P. O. Box 1113, Indianapolis, Indiana 46206

Strider, D. L., Mountain Horticultural Crops Research Station, North Carolina State University, Route 2, Fletcher, North Carolina 28732

Sumeghy, J. B., Hawkesbury Agricultural College, Richmond, New South Wales, 2753, Australia

Swaan, Hank, Agricultural Officer, Associated Products and Distribution Pty, Ltd., AMP Tower, 21st Floor, 535 Bourke Street, Melbourne 3000, Victoria, Australia

Taylor, Gordon, FMC Corporation, Niagara Chemical Division, P. O. Box 3091, Modesto, California 95353

The National Agricultural Library, Current Serial Record, Beltsville, Maryland 20705

Thomas, Lee, Asgrow Seed Company, P. O. Box 290, Filer, Idaho 83328

Tompkins, Daniel R. G., Department of Horticultural Food Science, University of Arkansas, Fayetteville, Rt. 6, Arkansas 72701

Torrey, T. C., W. Atlee Burpee Company, Fordhook Farms, Doylestown, Pennsylvania 18901

Touzard, C. M., Societe L. Clause, 91, Bretigny-Sur-ORGE, France

Trotter, Allen R., P. O. Box 725, 584 Derby-Milford Road, Orange, Connecticut 06477

Tucker, Carl L., Agronomy Department, University of California, Davis, California 95616

Union International Co., Ltd., Research and Development Lab., Botany Department, 25, West Smithfield, London E. C. I., England
Unilever Research Laboratorium, Duiven, Netherlands

Jakili, Nader G., USDA, ARS, Crops Research Division, Federal Experiment Station, Mayaguez, Puerto Rico 00708

van Waveren - Pflanzenzucht, GMBH 3405 Rosdor, Gottingen, Germany

Vaughan, E. K., Oregon State University, Department Botany and Plant Pathology, Corvallis, Oregon 97331

Vieira, C., Universidade Rural do Estado de Minas Gerais, Escola de Fos-Graduacao, Vicos, Minas Gerais, Brazil

Vilmorin, Andrieux, Sce Recherches Et, Selections a Verneuil, L Etang 77, France

Virgin, W. J., Del Monte Corporation, P. O. Box 36, 850 Thornton Street, San Leandro, California 94577

Voysest, Oswaldo, Department Crop Science, Michigan State University, East Lansing Michigan 48823

Walker, J. C., Department of Plant Pathology, University of Wisconsin, Madison 6, Wisconsin 53706

Wallace, D. H., Plant Breeding and Biometry Department, Cornell University, Ithaca, New York 14850

Washburn, H. G., Jr., 3053 West Pine Valley Road, N. W., Atlanta, Georgia 30305

Weibullsholm Plant Breeding Institute, Landskrowa, Sweden

Weigle, J. L., Department of Horticulture, Iowa State University, Ames, Iowa 50010

Wester, R. E., USDA Plant Industry Station, Beltsville, Maryland 20705

Wien, H. C., Department of Vegetable Crops, Cornell University, Ithaca, New York 14850

Wilkinson, Robert E., Department of Plant Pathology, Cornell University, Ithaca, New York 14850

Williams, Richard D., Pure Line Seeds, Inc., Box 91, Moscow, Idaho 83843

Williams, T. V., FMC Corporation, Seed Department, P. O. Box 3091, Modesto, California 95353

Wood, D. R., Department of Agronomy, Colorado State University, Fort Collins, Colorado 80521
Yagyu, Paul, Northrup, King and Co., Seed Research Center, 1310 Research Road, Eden Prairie, Minnesota 55343

Yohe, John, Department of Agronomy, College of Agriculture, University of Missouri, Columbia, Missouri 65201

Younes, Mohsen A., Kafr-Kela El-Bab, Gharbia, U.A.R. (Egypt)

Young, Dale H., (Borden) Comstock-Greenwood Foods, P. O. Box 267, Newark, New York 14513

Yukura, Yasuo, 46-7, 3-Chome, Miyasaka, Setagaya, Ku, Tokyo, Japan

Zwann, John A., P. O. Box 1, New Britain, Pennsylvania 18901

Zaumeyer, W. J., 3801 Thornapple St. Chevychase, Maryland 20015
BIBLIOGRAPHY

Breeding and Genetics

Compiled by Gregory Arp and Dermot Coyne
University of Nebraska, Lincoln, Nebraska


Proano, V. & G. L. Greene. 1968. Diferencia en el crecimiento de las plantas normales y enanas mutantes de frijol (Phaseolus vulgaris L.) var. 'Mexico 80-R' cultivadas en solucion Hoagland No. 2. (Differences in growth of normal plants and dwarf mutants of the bean (Ph. vulgaris L.) var. 'Mexico 80-R' grown in Hoagland 2 solution). Turrialba 18: No. 1: 75-76.


Pathology

Compiled by D. W. Burke
USDA, ARS, EPA, Irrigated Agriculture Research
and Extension Center, Prosser, Washington


spore formation in Fusarium solani by soil bacteria. Phytopathology 60: 479-84.

nutrition and soil substances in chlamydomospore formation by Fusarium. Phytopathology 60: 1732-37.

Plant Dis. Rptr. 54: 591-93.

Gayed, S. K. 1969. Effect of benomyl on black root rot of tobacco

Dis. Rptr. 54: 1077-79.

Gonzalez, L. C., and D. J. Hagedorn. 1970. Aphid transmission of pea
seed-borne mosaic virus. (Abstr.) Phytopathology 60: 1293.

Giffin, G. J. 1970. Exogenous carbon and nitrogen requirements for
chlamydomospore germination. (Abstr.) Phytopathology 60: 1011.

Gupta, B. M. 1970. New disease on mung bean from Udaipur, Rajasthan,
India. Plant Dis. Rptr. 54: 453-54.

Guthrie, James W. 1970. Factors influencing halo blight transmission
from externally contaminated Phaseolus vulgaris seed. Phytopathology 60: 371-72.

Haas, Jerry H. 1970. Effect of initial inoculum level on epidemics
of common blight of Phaseolus vulgaris. (Abstr.) Phytopathology 60: 1294.

Hawthorne, B. T., and Peter H. Tsao. 1970. Effects of separation of
spores from the chain and of culture age on germination of
chlamydomospores of Thielaviopsis basicola. Phytopathology 60:
891-95.

Hendrix, J. Walter, and Edward H. Lloyd, Jr. 1970. Influence of
stripe rust and water stress on wheat roots as revealed in mist

Henis, Y., and Y. Ben-Yephut. 1970. Effect of Propagule size of
Rhizoctonia solani on saprophytic growth, infectivity and virulence
on bean seedlings. Phytopathology 60: 1351-56.

Herr, L. J. 1970. Disc-plate method for selective isolation of
Rhizoctonia from soil. (Abstr.) Phytopathology 60: 1295.

on biosynthesis of phaseollin in excised pods of Phaseolus vulgaris.
Phytopathology 61: 79-82.


*****


*****
Culture, Physiology and Quality

Compiled by Roger W. Sandsted, H. C. Wien
Paul A. Hughes, Romeo R. Martinez, and Donald Wallace
Cornell University, Ithaca, New York


*********

Miscellaneous


References which arrived after the deadline date of February 15, 1971.


BEAN IMPROVEMENT COOPERATIVE
FINANCIAL STATEMENT

March - 1971

Balance on hand as of March 7, 1970 $461.56

Income during period from dues and sale of back issues of reports $450.60

Interest on $400 deposited in savings account (April 25, 1969) as of January 1, 1971 $28.17

$940.33

Expenses:

Bank Service Charges $2.14

BIC Report

300 Front and back covers for BIC Report $10.20

250 plain envelopes (10 x 13) for Report 6.02

33 Reams 8½ x 11, 28 lb. white A. B. Dick Vellum 107.07

3 qr. Stencil 9.89

Rental of typewriter 16.12

Typing, proofing, assembling, addressing envelopes, stuffing and stamping - 85 hours at $2.00 per hour 170.00

Total cost of BIC Report $319.30

Total Expenses 321.44

Net balance available as of March 15, 1971 $618.89

BIC Contingency Fund

Interest on this fund since February 3, 1970 $267.73

9.87

277.60

Grand Total available as of March 15, 1971 $896.49