
Texas A&M



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Nomination of

Dr. Norman E. Borlaug

for

2005 National Medal of Science

National Science Foundation

Nomination of
Dr. Norman Borlaug
for
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Nomination Letter



TEXAS A&M UNIVERSITY

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Office of the President
Robert M. Gates

June 24, 2003

Ms. Susan Fannoney
Program Manager
National Medal of Science Committee
National Science Foundation
4201 Wilson Blvd., Rm. 1220
Arlington, VA 22230

Dear Ms. Fannoney:

It is a great pleasure for me to nominate Dr. Norman E. Borlaug for the National Medal of Science. The basis for Dr. Borlaug's nomination is his: 1) scientific success in breeding improved, semi-dwarf, disease-resistant varieties of wheat that may be grown across wide latitudes of the world producing high yields when grown with appropriate technologies; and 2) his humanitarian efforts in teaching poor farmers in the developing world how to grow these varieties increasing their yields many-fold. Through his continuing efforts over a lifetime Dr. Borlaug has become known as the father of The Green Revolution which has greatly increased the food supply in hungry areas of the world reducing malnutrition and starvation and enhancing peace. For his efforts Dr. Borlaug was awarded the Nobel Prize for Peace in 1970.

Dr. Borlaug, during the past 50 years, has become the most prominent agricultural scientist in the world today and the only one to receive a Nobel Prize. He has made great contributions to plant genetics, plant breeding and plant pathology. Many of the genetic materials and methodologies he developed in Mexico are still being used by wheat breeders across the world today. The semi-dwarf, disease-resistant wheat varieties he and his colleagues developed have increased the yields of wheat many-fold and have allowed countries such as India and Pakistan to become self-sufficient in wheat. These varieties presently are being grown on nearly 200 million acres across the world greatly alleviating malnutrition and starvation for millions of people in developing countries. On the basis of his scientific accomplishments Dr. Borlaug was elected to the U. S. National Academy of Sciences in 1968. Dr. Borlaug also has been honored by many governments, universities and scientific societies. He is the recipient of The Presidential Medal of Freedom (1977) and has received 50 honorary degrees from universities across the world and has been elected to the Academies of Sciences of 12 nations.

Ms. Susan Fannoney
June 24, 2003
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Dr. Borlaug has been credited with saving the lives of more people than anyone. He is driven in his quest to provide students and subsistence farmers with the knowledge needed to increase food production. During his career he taught thousands of students and farmers how to do this. He continues to do this even though he is in his late 80's. He teaches one semester a year at Texas A&M University. In addition, for the past several years, he has been working with farmers in sub-Saharan Africa, with the support of former President Jimmy Carter and The Sasakawa Global 2000 Program, demonstrating to them (and their governments) how to greatly increase the yields of corn and sorghum, two important food crops of this region. Dr. Borlaug and colleagues have demonstrated in farmers' fields that yields of corn and sorghum in these parts of Africa may be increased more than ~~100~~ 100-fold by growing improved, disease-resistant hybrid varieties with appropriate agronomic practices. In spite of his age, Dr. Borlaug remains vigorous spending several months a year in Africa working in the field.

Dr. Borlaug is a very accomplished scientist. The hungry people of Asia, Africa and Latin America can be thankful that he was not content to leave his findings in experimental plots or scientific journals. Instead, he went to farmers' fields to demonstrate to them and their governments ways to visibly improve the yields of important food crops. His work has had enormous impact in alleviating hunger and malnutrition, and in contributing to peace in much of the developing world. Because of his many accomplishments in increasing and sustaining world food production, Dr. Borlaug is most deserving of the National Medal of Science. I recommend him to you without reservation.

Sincerely,

for 
Robert M. Gates

Nomination of
Dr. Norman Borlaug
for
2005 National Medal of Science
National Science Foundation

Nomination Package

NOMINATION FOR NATIONAL MEDAL OF SCIENCE

<u>Nominee</u>	<u>Nominator</u>
Name: Norman E. Borlaug	Name: Dr. Robert M. Gates, President
Address: Department of Soil and Crop Sciences Texas A&M University College Station, TX 77845 g-kurten@tamu.edu 979-845-3342	Address: Texas A&M University 1246-TAMU College Station, TX 77843-1246 rgates@tamu.edu
Telephone:	Telephone: 979-845-2217

Biographical Data:

1. **Date and place of birth:** March 25, 1914 W Cresco, Iowa

If naturalized citizen, please check box:

2. **Education:**

B. S. Forestry, University of Minnesota, 1937
 M. S. Plant Pathology, University of Minnesota, 1940
 Ph.D Plant Pathology, University of Minnesota, 1942

3. **Positions Held:**

The U. S. Forest Service, 1935-38; Instructor, University of Minnesota, 1941
 Microbiologist, E. I. DuPont de Nemours, 1942-44; Research Scientist in Charge of Wheat Improvement, 1944-60, Cooperative Mexican Government-Rockefeller Foundation Agricultural Program (OEE); Associate Director, Rockefeller Foundation, assigned to Inter-American Food Crops Program, 1960-63; to CIMMYT, 1964-79; Director, Wheat Program, International Maize and Wheat Improvement Center (CIMMYT) 1966-79; Acting Director, 1981; Senior Consultant to CIMMYT, 1979-
 Honorary Visiting Professor, University of Minnesota, 1980; A. D. White Distinguished Professor at Large, Cornell University, 1983-85; Distinguished Professor of International Agriculture, Texas A&M University, 1984- ; President, Sasakawa Africa Association, 1986-

4. **Honors:** Nobel Prize for Peace, 1970; Aztec Eage, Government of Mexico, 1970; Presidential Medal of Freedom, 1977; Presidential World Without Hunger Medal, 1985; U. S. National Collegiate Wrestling Hall of Fame, 1993; Phillip Abelson Award, AAAS, 2002; Rotary Award for World Understanding and Peace, 2002; NSF Vannevar Bush Award, 2001; NAS Public Welfare Medal, 2002; Member of U. S. National Academy of Sciences, 1968; American Academy of Arts & Sciences, 1976; Royal Society of England, 1976 and 14 other scientific academies. Member, Presidential Commission on World Hunger, 1978-79 and Presidential Council of Advisors on Science and Technology, 1990-93. Named by Progressive Farmer Magazine as one of 25 scientists making the greatest contribution to agriculture in the 21st century. Recipient of 50 honorary degrees from universities world-wide.

Nominee: Norman E. Borlaug

Proposed Citation (limit to 1-2 sentences)

Dr. Norman Borlaug developed high yielding varieties and production practices that greatly increased the yields of wheat around the world creating the "Green Revolution". Through his successful efforts in demonstrating to farmers and governments how to grow the new high-yielding varieties of wheat, and other cereal crops, Borlaug has prevented malnutrition and starvation by millions of people in the developing world thereby enhancing peace.

Narrative statement (limited to this space) describing nominee's qualifications as described in Section III.

Dr. Norman Borlaug, father of The Green Revolution, was awarded the Nobel Prize for Peace in 1970 for efforts in feeding the hungry of the world. This saga began in 1944 in Mexico when Borlaug was placed in charge of wheat improvement in a program sponsored by the Rockefeller Foundation. During the next 15 years, Borlaug and associates made thousands of crosses to produce the high-yielding, semi-dwarf, disease-resistant varieties of wheat. By growing these varieties under improved management practices, average wheat yields in Mexico increased six-fold and total annual production increased from 360,000 metric tons to 5 million. By 1956, Mexico had become self-sufficient in wheat.

Borlaug was convinced that this technology could produce similar increases in wheat yields in Pakistan, India and other parts of Asia where vast numbers of people were suffering from malnutrition and starvation. In these areas, Borlaug developed production practices under which the wheat varieties (and soon after, new rice varieties) could express their high genetic potential. He not only had to work with farmers to teach them how to produce maximum yields from the new varieties, he also had to work with governments and institutions on farm credit, availability of production inputs and pricing policies. He and his colleagues were successful in overcoming these obstacles. Within a few years, wheat and rice yields were more than doubled and Pakistan and India became self-sufficient in wheat and rice production and mass starvation was averted. This was the beginning of The Green Revolution which continues today in Asia, Africa and Latin America where people still are hungry. The high-yielding wheat varieties today are grown on more than 185 million acres throughout the world and have doubled yields from 300 to 600 million tons during the past 40 years. These varieties have kept millions of people from suffering malnutrition and starvation. It has been said for good reason that Norman Borlaug has saved more lives than any person.

Borlaug's scientific successes led to his election to the National Academy of Sciences in 1968 based on his work in plant breeding and plant pathology. He and his colleagues developed successive generations of wheat varieties that are semi-dwarf, resistant to lodging and possessing broad and stable disease-resistance, insensitive to photoperiod and broadly adaptable to growing conditions across many degrees of latitude. These wheats and the improved crop management practices used in their production transformed agriculture across the developing world.

Even though he is in his late 80's, Borlaug's quest to produce more food for the hungry has not ended. Currently he is working in 15 countries of Africa where he is demonstrating in farmers' fields that yields of corn and sorghum may be increased more than 100-fold by the use of improved disease-resistant hybrid varieties grown with the type of production practices developed during The Green Revolution.

List of pertinent publications (limit to this page)

1952. Borlaug, N. E.; Campos, T. A.; Bayles, B. B. "Mexican Varieties of Wheat Resistant to Race 15B of Stem Rust". *Plant Disease Reporter* 36(4): 147-150.
1954. Borlaug, Norman E., "Mexican Wheat Production and Its Role in the Epidemiology of Stem Rust in North America". *Phytopathology*, 44 (1954) 398-404.
1958. Borlaug, Norman E., "The Impact of Agricultural Research on Mexican Wheat Production". *Transactions of the New York Academy of Science*, 20(1958) 278-295.
1958. Borlaug, N. E. "The Use of Multilineal or Composite Varieties to Control Airborne Epidemic Diseases of Self-pollinated Crop Plants". Paper presented at the *International Wheat Genetics Symposium*, 1, 12-27; University of Manitoba, Winnipeg, Canada.
1965. Borlaug, Norman E., "Wheat, Rust, and People". *Phytopathology*, 55 (1965) 1088-1098.
1968. Borlaug, Norman E., "Wheat Breeding and Its Impact on World Food Supply". *Third International Wheat Genetics Symposium*, 1, Canberra, Australia. Australian Academy of Science.
1971. Zillinsky, F. J.; Borlaug, N. E. "Search for a New Food Source for Man: Triticale Research in Mexico". *Agricultural Science Review* 9(4): 28-35.
1983. Borlaug, N. E. "Contributions of Conventional Plant Breeding to Food Production". *Science* 219: 689-693.
1997. Rajaram, S. and Borlaug, N. E. "Approaches to Breeding for Wide Adaptation, Yield Potential, Rust Resistance, and Drought Tolerance". Paper presented at *Primer Simposio Internacional de Trigo*, Cd. Obregon, Mexico, April 7-9, 1997.
1999. Borlaug, N. E. "How to Feed the 21st Century? The Answer is Science and Technology". In: *The Genetics and Exploitation of Heterosis in Crops*, Coors, J. G.; Pandey, S. (eds.). Madison, WI (USA)
2000. Borlaug, N. E. "Ending World Hunger. The Promise of Biotechnology and the Threat of Antiscience Zealotry". *Plant Physiology* 124(2): 487-490.
2000. Borlaug, Norman E. "The Green Revolution Revisited and The Road Ahead". *30th Anniversary Lecture, The Norwegian Nobel Institute, Oslo Norway*. September 8, 2000.

References: (Identify 3 individuals not from the nominee's home institution who will provide letters of support). References must be requested by the nominator and can be sent electronically through <http://www.fastlane.nsf.gov/fastlane.jsp>.

Name: Dr. John A. Pino
Title: Director, Div. of Agric. Rockefeller Foundation
(Retired)
Address: 31 Orchard Hill Rd.
West Port, CT 06880

Name: Dr. Ronald D. Phillips
Title: Regents Professor
Address: Dept. of Agronomy & Plant Genetics
University of Minnesota
411 Borlaug Hall, 1991 Buford Circle
St. Paul, MN 55108

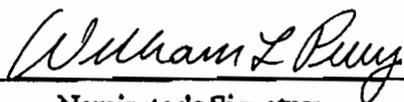
Telephone: 203-226-9305

Telephone: 612-625-1213

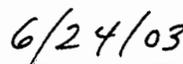
Name: Dr. Peter H. Raven
Title: Director
Address: Missouri Botanical Garden
P.O. Box 299
St. Louis, MO 63166-0299

The information requested on this nomination form and the letters of support is solicited under the authority of the National Science Foundation Act of 1950, as amended, and will be used and disclosed to reviewers and the White House in connection with the selection of qualified applicants. See Privacy Act/Public Burden statement on last page of this solicitation brochure.

Telephone: 214-577-5111



Nominator's Signature



Date

Mail to:

Program Manager
National Medal of Science Committee
National Science Foundation
4201 Wilson Blvd, Rm 1220
Arlington, VA 22230

Nomination of
Dr. Norman Borlaug
for
2005 National Medal of Science
National Science Foundation

Letters of Support



TEXAS A&M UNIVERSITY

College of Agriculture and Life Sciences

Department of Entomology

July 9, 2003

Ms. Susan Fannoney, Program Manager
National Medal of Science
National Science Foundation
4201 Wilson Blvd., Room 1220
Arlington, VA. 22230

Dear Ms. Fannoney:

It is an honor for me to support the nomination of Dr. Norman Borlaug for the National Medal of Science. In my opinion, Dr. Borlaug had greater impact in increasing the production of wheat, rice and other cereal grains in the developing world than any scientist in the 20th Century. Even though he is in his 80's he continue this work in Africa today. As Father of Green Revolution he introduced high yielding grain varieties and the technology needed for their production to subsistence farmers in the developing world. By implementing this technology these farmers greatly increased yields, preventing starvation and alleviating hunger and malnutrition for millions of people. Because of his scientific and humanitarian accomplishments, Norman Borlaug is most deserving of the National Medal of Science.

Beginning in Mexico in the mid-1940's Dr. Borlaug developed new semi-dwarf varieties of wheat that were high yielding, disease-resistant, insensitive to photoperiod and that could be adapted for production across wide latitudes. By growing these varieties with the agronomic practices developed by Borlaug and colleagues, wheat yields in Mexico increased more than six-fold making the country self-sufficient in wheat.

Because of this success Dr. Borlaug was soon recognized as one of the world's premier wheat breeders. The germplasm and methodologies he developed were incorporated into many wheat breeding programs in the United States and other developing countries.

Dr. Borlaug was not content with scientific recognition as he wanted to alleviate hunger in the world. He believed his varieties could be adapted to the developing world in such places as India, Pakistan and other Asian countries. He gained the support of The Rockefeller Foundation and other international agencies to initiate work with subsistence farmers in these countries.

Borlaug formed a team of technical workers whom he personally led in placing demonstration plots in farmers' fields. He worked with farmers and government officials demonstrating the benefits to be gained from growing the new varieties. His early success was the basis for the Green Revolutions which soon incorporated other important food grains such as rice, corn and sorghum. As

the result of the Green Revolution, the yields of these important crops were greatly increased. India, Pakistan and other Asian countries became self-sufficient in grain and famine was averted.

Dr. Borlaug now is working in sub-Saharan Africa where he has demonstrated the yields of corn and sorghum may be increased as much as 10-fold by growing, with appropriate inputs, new hybrid varieties he helped develop at CIMMYT.

Because of his scientific accomplishments as a plant breeder and his humanitarian efforts in instigating and sustaining the Green Revolution that has fed so many of the world's hungry and poor, Dr. Norman Borlaug merits selection as a recipient of the National Medal of Science. I recommend him without reservation.

Sincerely,

A handwritten signature in cursive script, reading "Perry L. Adkisson". The signature is written in dark ink and is positioned above the printed name.

Perry L. Adkisson

Distinguished Professor Emeritus

Dr. Perry Adkisson
Department of Entomology
Texas A&M University
College Station, Texas 77843-2475

Or

Mrs. Susan E. Fannoney
National Medal of Science Committee
National Science Foundation
4201 Wilson Blvd, Rm 1220
Arlington, VA 22230

Dear Dr. Atkinson:

It is a great privilege to support the nomination of Dr. Norman E. Borlaug for the National Medal of Science. The accomplishments of Dr. Borlaug are without doubt one of the most remarkable examples of how knowledge gained from science and research can change the lives of millions upon millions of people. His work has had profound influence throughout the world benefiting not only the people of developing countries but also developed countries.

Dr. Borlaug is not what some people call a bench scientist. His work is in the field. If any single quality characterizes his activities, it is that he takes his work directly to the farmer. Norm believes that you don't wait to act until you have all of the answers. You go with the best you have as long as you have confidence that it will work. You improve every aspect of what you are doing as you go along. Everything is dynamic. You don't wait for things to happen. You make things happen. You do not do this by chance. What Norm has accomplished has been through sweat and hard work. He made the science work. He drew on new knowledge from any source. He not only learned his science, he made discoveries, and he knew how to put it all together to achieve the remarkable changes in plant production seen in countries around the world that began with his work in Mexico. He is known and revered by wheat scientists throughout the world.

If you have worked or traveled with Norm you know that he is in the field by the time the sun rises. On one visit I made with Norman to the research station in Ciudad Obregon in Sonora Mexico, we were in the field by 4:00 AM. He seemed to know every single plant in each experimental plot. After putting in several hours observing plants and making his selections he may stop to have some breakfast. He seems to run on pure enthusiasm. Whether in the field or at a banquet, one rarely sees Norm with food in hand.

Shortly after World War II when Norm went to Mexico to work with Dr. J. George Harrar, he had but one order and that was develop ways to transform Mexico's agriculture. Harrar and several brilliant scientists who were advisers to the Rockefeller Foundation's agricultural program in Mexico focused on field research and the training of young Mexican scientists. Mexican farmers believed in Norm's materials. He has the ability and personality to interact with the most humble farmer because he is believable and one cannot deceive farmers very easily. He has met with Ministers and Presidents, to whom he has carried the word about the importance of science and research in feeding people,

This model, which became the basis for the Green Revolution, was extended to many other countries including India and eventually to the world through the International Agricultural Research Centers (IARCS). When most men have called it a day and retired, Borlaug keeps up a pace that would challenge most young men. He does so to this day. Norm has been the inspiration for hundreds of young scientists around the world and even to other Foundation field staff. He is curious. He is observant. He is widely read. He is knowledgeable about many things. Trained as a forester he maintains a keen interest in natural systems. He cares about people and he cares about the world. One could write many glowing words about Norm. The fact is that he remains the real man that he has always been.

Again I am highly pleased and honored to support the nomination of Dr. Norman E. Borlaug for the National Medal of Science.

Sincerely yours

John A. Pino

Nomination of
Dr. Norman Borlaug
for
2005 National Medal of Science
National Science Foundation

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Last Updated: 11/22/2005

The President's National Medal of Science

2003 National Medal of Science Laureates



2006 Call for Nominations is open until **December 31, 2005**. Criteria and nomination procedures are at www.fastlane.nsf.gov/honawards/.

[Letter from Committee Chair \[PDF 114 KB\]](#)

The National Medal of Science was established by the 86th Congress in 1959 as a Presidential Award to be given to individuals "deserving of special recognition by reason of their outstanding contributions to knowledge in the physical, biological, mathematical, or engineering sciences." In 1980 Congress expanded this recognition to include the social and behavioral sciences. The Committee of 12 scientists and engineers is appointed by the President to evaluate the nominees for the Award. Since its establishment, the National Medal of Science has been awarded to 417 distinguished scientists and engineers whose careers spanned decades of research and development. The recipients database from 1962 to the present can be searched at <http://www.nsf.gov/nsb/awards/nms/recipients.cfm>.

National Medal of Science

Nomination Procedures

The following information should be used in preparing a nomination.

Criteria

The Committee has established the following guidelines for selection of candidates.

- (a) The total impact of an individual's work on the present state of physical, biological, mathematical, engineering or social and behavioral sciences is to be the principal criterion.
- (b) Achievements of an unusually significant nature in relation to the potential effects of such achievements on the development of scientific thought.
- (c) Unusually distinguished service in the general advancement of science and engineering, when accompanied by substantial contributions to the content of science at some time.
- (d) Recognition by peers within the scientific community.
- (e) Contributions to innovation and industry.
- (f) Influence on education through publications, students, etc.
- (g) Must be a U.S. citizen or permanent resident who has applied for citizenship within the past 12 months.

Nomination Procedures and Deadline for Submission

All nominations and letters of support shall be submitted through the NSF Fastlane Honorary Awards at www.fastlane.nsf.gov/honawards/. Users of the Honorary Awards system must register the first time they access the program.

Nominations remain active for a period of **three years**, including the year of nomination. After that time, candidates must be renominated with a new nomination package for them to be considered by the Committee.

Letters of Support

Nominators are responsible for securing three letters in support of the candidate's nomination.

Letters shall be submitted independent of the nomination through www.fastlane.nsf.gov/honawards/

Inquiries

For further information concerning the Award program or nomination process, contact:

Ann Noonan
Honorary Awards Specialist
National Medal of Science Committee
National Science Foundation
4201 Wilson Boulevard, Rm 1225
Arlington, VA 22230
Email: nms@nsf.gov
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