

Updated reports on the revolutionary capacity of Øyjord plot seeders in plant breeding and variety trials and IAMFE

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This report is a short presentation of myself and “The International Association on Mechanization of Field Experiments (IAMFE)”. To illustrate the results of my development of plot seeders, collections of statements from the users are presented.

1955. I graduated from the Norwegian University of Life Sciences.

1957. I started to design batch-type plot seeders for plant breeding and variety trials. The first Øyjord plot seeder/drill was constructed in the workshop of the Norwegian Institute of Agricultural Engineering during the winter 1957/58.

1958. 59 years ago, in the spring of 1958, the first Øyjord plot seeder came into use at the university research farm, Vollebekk. Please see: www.iamfe.org and read the report of Øyjord plot seeders. I also recommend you to see: www.ojord.org. You will also see the Øyjord plot seeders in operation by Google: YouTube Egil Øyjord (or Egil Oyjord) Click on the pictures and see the various models at work in the fields.

1959. Several models of plot seeders for front mounting on Agria 1700 two-wheeled garden tractor were developed and tested.

1960. In the spring, the latest models of four rows and a ten rows Øyjord were tested at the State research farm, Møystad. In a letter of May 23, the cereal breeder Mons Bjaanes wrote: (translation). ***“The new drills have finally ended the time of galley slavery at Møystad. It was completely without the sense that three strong men should pull the old monster of a drill (Pracner) in our technical time when the Russians are shooting goal on the moon. May I congratulate you with the good results. This is the best solution of the experimental seed drill problem I have seen”.***

1960. The Norwegian Ministry of Agriculture granted NOK. 200 000 for production of a series of plot seeders and purchase of the Agria tractors needed for the Norwegian research institutions.

During the winter 1960/61, the world’s first serie production of 20 units of 10-rows and five units of four rows plot seeders with feeding of seeds from one feeder were manufactured by Jens A. Schou Mek. Verksted, Drøbak, Norway.

56 years ago, in the spring of 1961, Norway was the first country in the world where all the plant breeding research institutions started to use batch type plot seeders in plant breeding and variety trials.

1962. In February, I received a Master’s degree in agricultural engineering and a minor in statistics at Michigan State University, East Lansing and returned to Norway where I continued my development of plot seeders.

1966. No employees in the Schou factory had the necessary qualifications to take care of the necessary correspondence and development of new models of plot seeders. In agreement with Mr. Schou, I established and operated the Oyjord Research Laboratory in the Schou factory. During ten years, I developed many models of self-propelled and tractor mounted plot seeders. I also led the export of my plot seeders during this period. In 1976, I terminated the Oyjord Research Laboratory.

From 1960 to 1976, the Øyjord batch type self-propelled and tractor mounted plot seeders manufactured by Jens A. Schou Mek. Verksted, Drøbak, were exported to 57 countries all over the world.

The following quotations of international letters shows the revolutionary increases in capacity and reliability obtained by Øyjord plot seeders or copies of Øyjord plot seeders in plant breeding and variety trials in more than 130 countries of the world:

1972. Lebanon. In a letter of June 19, Dr. J. Dean McCrary, Agricultural Machinery Specialist, The Arid Lands Agricultural Development Program, Ford Foundation, Beirut, wrote: *"The two planters were received with great enthusiasm. The research plantings, all seeded by the Oyjord planters, were extraordinary. The wheat and barley nurseries were all seeded in the fall. About a month ago, the rice nurseries covering about 25 acres were also seeded very successfully, using the Oyjord planters. - - In general, I personally have only the highest praise for the machines. I can report the same from the Lebanon and Egypt as well as Iran"*.

1972. Lebanon. In another letter, Dr. J. Dean McCrary wrote: *"Two persons on the seeder in three hours drilled the same number of plots as 15 persons used 20 days to sow by hands. The evaluation was better because the varieties were sown the same day"*.

1972. CIMMYT, Mexico. In a letter of Dec. 22, the winner of the Nobel Peace Prize 1970, Dr. Norman E. Borlaug wrote: *"The small plot seeders have been very helpful in increasing the reliability of experimental research in India, Tunisia, Lebanon, etc."*

1974. Sweden. In a letter of March 22 from Weibull AB: *"Earlier the plant progeny plots were hand sown. Today Øyjord plot seeder with three persons save at least 50 persons"*. This means that a saving cost of the labor of 96 % was obtained.

1974. Norway. Mr. Jens A. Schou initiated the process of closing the operation of his factory. He started to realize his plan to move to Florida. After some years, the factory became a shopping center.

1974. I decided to move the production rights of my self-propelled plot seeders to the Wintersteiger factory in Austria and the Hans-Ulrich Hege factory in Germany.

1975. Upon an application from FAO in Rome, The Norwegian Agency for International Development (NORAD) granted US \$ 100 000 for purchase of 25 Øyjord tractors mounted plot seeders from Jens A. Schou Mek. Verksted and 25 plot threshers to 20 countries in Africa and the Near- East. These countries were Afghanistan, Algeria, Cyprus, Egypt, Ethiopia, Iraq, Iran, Jordan, Kenya, Libya, Pakistan, Peoples Dem. Rep. Yemen, Tunis, Saudi Arabia, Sudan, Syria, Sultanate of Oman, Yemen Arab Rep.

1976. Jens A. Schou Mek. Verksted manufactured and sent the ordered machines to these countries upon orders from FAO.

1976. I transferred production rights of my tractor mounted plot seeders to Wintersteiger in Austria. By this decision, I was able to use my time to promote "The International Association on Mechanization of Field Experiments (IAMFE)". My main work was organizing of International and Regional IAMFE Conferences and Exhibitions. See www.iamfe.org. Click International IAMFE Conferences.

1982. India. In a letter of Oct. 19, the Senior Farm Manager, Mr. Bheem Singh, Farm Machinery Operation Service Unit, Indian Agricultural Research Institute, New Delhi wrote: *"This station has three Oyjord experimental seed drills. Two of these were brought in by the Rockefeller Foundation in the late sixties, and the third one was bought in 1980. All the three machines are in use after making certain changes in the old models. The petrol engine was replaced with a self- starting a diesel engine in one*

machine whereas the second one was converted for mounting on a tractor in 1979. **I am glad to inform that the experimental drill designed by you is the most wanted equipment at this station”.**

1983. Mexico. Copy of a letter of February 22nd from Dr. Arthur Klatt, Associate Director, Wheat program, International Maiz and Wheat Improvement Centre (CIMMYT) to The Director General of the Norwegian Agency for International Development (NORAD): **“In the late 1960s and early 1970s the wheat research program in CIMMYT seeded all of its nurseries by hand. In some years, over 100 hectares of breeding nurseries, yield trials, and multiplications were seeded. In about 1972, we made the decision to mechanize the program, and of course, the first piece of equipment to purchase was the Oyjord drill. We soon learned the utility and efficiency of this drill and proceeded to purchase many more drills. In the late 1970s, a double cone drill was developed by Mr. Oyjord, and this drill greatly facilitated the seeding of segregating populations. We have subsequently added several of these drills to our machinery pool. Today we have a total of 14 single band double cone drills. In the past when all our seeding was done by hand, it frequently took us more than one month to seed our breeding nurseries of approximately 80 hectares. Today we have more than 180 hectares of breeding nurseries and yield trial plots, and we seed our nurseries in about 10 to 14 days. In a similar manner, national research programs around the world have adopted the Oyjord drill. Of course, we have encouraged many national programs to purchase these drills to facilitate their breeding activities, and in many cases, we have made the purchases for them. On the basis of a recent questionnaire of CIMMYT, we have estimated that approximately 65 % of the national programs are using mechanical seeders, and probably 90 percent of these programs are using Oyjord drills. This machine has facilitated more uniform seeding and germination. It is our experience that the first type of mechanization requested by a national program is a mechanized seeder and normally they specifically request an Oyjord drill. These inexpensive drills have probably saved untold thousands and maybe millions of man hours in cereal research programs around the world. More importantly, they have led to more accurate research results, which have facilitated the selection of better varieties. Many programs consider them as an indispensable part of the research program, and new requests come in everyday for additional drills”.**

Please Google www.iamfe.org Click Øyjord plot seeders and read Quotations of letters.

1983. USSR. In a meeting on November 21 in the USSR Ministry of Agriculture the leader of the agricultural research, prof. N. N. Ulrich made the following statement: **“Your machine was a revolution in plant breeding in USSR”.** (This statement was based on six years of experiences with my machines and at least three years of experiences with copies. (In 1967, USSR purchased 20 Oyjord self-propelled plot drills from Jens A. Schou Mek, Verksted, Drøbak. A great USSR operated factory of plot research equipment, "VIM" in Moscow, started to manufacture tractor mounted plot seeders as copies of the seeders from Norway. It was reported that up to 1989, 600 batch type plot seeders had been made by VIM. In 2017, I hope to get “up to date” information from VIM).

1991. Sweden. In a letter of Mars 11th from the barley breeder, Gunnar Svensson, Weibull AB, Landskrona, wrote (translation): **“But first of all I would like to underline how much your pioneer work has meant in the mechanization and above all in the drilling of field experiments, not least for the plant breeding. Docent Fajer Fajerson, who has taken part during 45 years of development, has stated that the greatest step forward in his time has taken place in the drilling of field experiments. The Oyjord machines have meant quicker (10-20 times), safer drilling of field experiments with less work but with better quality of the experiments that followed”.**

1993. Hungary. In a letter of December from Hungary, Ing. Kunsagi and Dr. M. Jolankai presented a table showing that since 1975 the capacity of sowing 10-14 sq. m plots increased from 15-20 plots per

hour to 200-400 plots per hour with two persons on Øyjord plot seeders. The same plant breeders wrote: *“During the past two decades Oyjord sowing devices conquered the world of field experiments. Wherever you are, whatever planter you see, you can almost be sure that the implement houses an Oyjord device. There is evidence that this technical invention represents the most successful contribution of engineering in the field of agricultural research”*.

In his book “Wheat Breeding”, published in 1976, the Hungarian wheat breeder, Dr. Janos Lelley wrote: *“In the present competition in wheat breeding, up-to-date mechanization is just as indispensable as genetic or biological research”*.

2001. Austria. In a supporting letter of February 21 for the nomination of Professor Egil Øyjord for the World Food Prize, the Wintersteiger Company, Ried im Innkreis, wrote: *“We have sold approx. 5000 drills/cell wheels in almost 100 countries all over the world. Bearing in mind the efficiency of these drills, the indirect impact on world food production is huge. We support the award strongly because we are sure, that no other technical instrument put in the hands of scientists and researchers has ever contributed more to the world food security and increase to food production than Egil Oyjord’s plot seeder”*.

2016. China: In a letter of Nov. 5, Professor emeritus Shisenbao, China Agricultural University, Beijing wrote: *“Before the Øyjord plot seeders came to China one person could hand-plant 3-4 plots per hour. After the first Øyjord plot seeders came to China in 1978-80, the capacity increased up to 100 plots per person-hour”*.

This means that the saving of labor costs was reduced by 96-97 %. **The same savings of labor costs were obtained in all countries where Øyjord self-propelled or tractor mounted plot seeders replaced hand sowing.**

From 1960 to 1976, the Øyjord self-propelled and tractor mounted plot seeders were exported from Norway to 57 countries all over the world.

The establishment and purpose of the “International Association on Mechanization of Field Experiments (IAMFE)”.

1964. Norway. “The International Association on Mechanization of Field Experiments (IAMFE)” was founded at “NATO Advanced Study Institute on Mechanization of Field Experiments”, which was arranged in Norway.

1970. CIMMYT, Mexico. In a letter of Nov. 13, the winner of the Nobel Peace Prize 1970, Dr. Norman E. Borlaug wrote to me: *“It would be a pleasure to work with you and IAMFE in the furtherance of the green revolution”*.

1972. In a letter of Dec. 22, Dr. Norman E. Borlaug stated: *“The International Association on Mechanization of Field Experiments (IAMFE) is playing a vital role in promoting the development of machinery to assist the scientists to reduce experimental error”*.

The main purpose of IAMFE was to promote mechanization of field experiments in plant breeding to increase the world food production. Reduction of the experimental error was a very important advantage of mechanization.

So far, 15 International IAMFE Conferences and Exhibitions have been arranged: Norway 1964, West-Germany 1968, Czechoslovakia 1972, USA 1976, Netherlands 1980, Ireland 1984, Hungary 1988, Germany 1992, China 1994, France 1996, Russia 2004, Denmark 2008, China 2012 and Russia 2017. See www.iamfe.org.

So far, eight Regional IAMFE Conferences and Exhibitions have been arranged: Sweden 1977, India 1985, Syria 1987, Lithuania 1995, Argentina 1998, and St. Petersburg, 2006, 2010, and 2014.

1995. The Research Council of Norway granted NOK. 60 000 for a project named: “Cooperative Project on Development of Seeders and Harvesters” as a project between IAMFE and China Agricultural University (CAU). This grant was used during the years 1995, 1996 and 1997. Four Chinese professors were invited to Norway as IAMFE-stipendiaries to study mechanization of field experiments. The grant gave IAMFE the possibility to renew an old office at CAU as a Chinese IAMFE Centre. We equipped our Chinese IAMFE Centre with telefax and computers. The grant made it also possible to work out and publish a Chinese textbook on field plot and laboratory equipment. This book was published in 1998. Together with the Proceedings of IAMFE/CHINA 1995, it is used as a textbook at Chinese universities.

2012. The General Assembly of IAMFE 2012 decided to move “The International IAMFE Centre” from St. Petersburg to Qingdao Agricultural University, Shandong Province, China. Please see the home page of IAMFE: www.iamfe.org

2017. In a letter of April 8, the President of IAMFE, Prof. Shang Shuqi wrote: *“In China at least 3 manufacturers of plot research equipment will participate in our conference and exhibition, and more than 10 delegates will attend this event. As you know, China has got much more achievements on plot seeders and harvesters under the Oyjord technology. Some of them will be shown by papers, posters or machines in Moscow”.*

2017. See: www.iamfe.org and read the Report from our 15th International IAMFE Conference and Exhibition on Mechanization of Field Experiments arranged in Moscow June 26-30, 2017.

Statements, honors, and awards

1964. Among many flattering statements from a Resolution adopted by the participants of the IAMFE/NORWAY '64 Conference, I am referring this: *“We would single out the name of Egil Øyjord as one deserving our highest praise for his farsightedness and motivation that made this meeting possible. We are well aware of the efficient planning that has made this a well-organized and conducted conference”.*

1972. I received the Mexican-issued *“Green Revolution Commemorative Medal”* from the Nobel Peace Prize Winner 1970, Dr. Norman E. Borlaug.

1988. In the introduction of the Proceedings of the Eight International IAMFE Conference on Mechanization of Field Experiments in Hungary in 1988, the plant breeder and famous manufacturer of plot research equipment, Dr. hc. Hans-Ulrich Hege, Germany, wrote about me: *“He was not the first man who started to overthink the need for mechanical aids. But he was one of the most efficient persons in finding the right tools. And he was absolutely the first who saw the need for an international cooperation in this sector. His name is known all over the world. His merits are not only to honor in the more advanced breeding countries. They are of the highest influence in the developing countries... – I had the chance to accompany Egil Oyjord through nearly the whole period of 25 years of international work. Thank you very much Egil, for your enthusiasm, your promotions, your fairness, your promoting of human relations during these 25 years of work. And take all our good wishes for the future, including the wish for a successful continuation of this work”.*

1989. In a letter of Dec.13, the Chairman of the Organizing Committee of IAMFE/HUNGARY 1988, Vice Rector of the Hungarian University of Agricultural Sciences, Debrecen, Dr. Ernø Pfau, wrote to me: *“Please do not take it as a flattering, but your behavior set an example and left deep traces in me. I felt many times that if we could work together with people like you, we would be able to do much more for ourselves and others during our limited period of life”.*

1994: At the banquet for celebration of the closing of the Ninth International IAMFE Conference and the 30th Anniversary of IAMFE, I was awarded a plaque from the Organizing Committee of IAMFE/CHINA '94, stating: *"Your outstanding contributions have brought the good name of Øyjord to all over the world and most gratefully to China "*. The plaque was handed over by the Chinese Vice Minister of Agriculture, Mr. Liu Cheng Guo.

1994: Appointed Honorary Professor of Beijing Agricultural Engineering University. Upon a change of the name to China Agricultural University (CAU), this honor was transferred to CAU.

1998. At a meeting of Czech Plant Breeders and Research Workers arranged in Mendel University of Agriculture and Forestry, Brno, Czech Republic, I was honored as Prof. Dr. with a diploma and a Mendel medal for my worldwide contribution to mechanization of field experiments and for my cooperation with the Czech plant breeders and the earlier Czechoslovakian plant breeders.

1998. At the celebration of my 70th birthday, the Executive Secretary of IAMFE and The Executive Committee and the members of IAMFE awarded me a plaque stating: *This is to certify that Prof. Egil Øyjord, Founder and President of IAMFE since 1964 has extraordinary merits in organizing the International Association on Mechanization of Field Experiments (IAMFE)".*

2000. At the 10th General Assembly of IAMFE arranged at IAMFE/AAB 2000 in England, I resigned as President of IAMFE and was appointed Honorary President, Founder, and Patron of IAMFE and Honorary Member of the Executive Committee of IAMFE.

2001. The Executive Committee of IAMFE nominated me for the World Food Prize www.worldfoodprize.org.

2003. I received the Kings Medal in Gold for Merits. (The original proposal came from China).

2004. Appointed "Honorary Doctor (Dr.h.c.)" of St. Petersburg State Agrarian University (SPSAU) Pushkin, St. Petersburg, Russia.

2013. Appointed Honorary Professor of Qingdao Agricultural University, Shandong Province, China.

2014. At the celebration of the 50th Anniversary of IAMFE which took place at the Norwegian University of Life Sciences, Ås, Norway, I received The IAMFE Certificate of Honor stating: *"Egil Øyjord, For your tireless work in the foundation and development of IAMFE, the IAMFE is pleased to honor you with The Lifetime Outstanding Contributing Award "*.

2016. The homepage of IAMFE was updated and moved from the Swedish University of Agricultural Sciences to Qingdao Agricultural University, Shandong Province, China.

I am very proud that IAMFE, headquartered in China, has honored me on the IAMFE website by writing: *"The Founder of IAMFE is Professor Egil Øyjord from Norwegian University of Life Sciences, who is a famous expert of field experiments mechanization in the world".*

2017. Representatives of China, Russia, Norway and CIMMYT, Mexico, nominated me for the World Food Prize www.worldfoodprize.org.

Norway, December 2017

Egil Øyjord