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T VOOR PHYTOPATHOLOGIE
LABORATORIUM VOOR BLOEMBOLLENONDERZOEK
TE LISSE

DIRECTEUR: PROF. DR. E. VAN SLOGTEREN

No. 58

DECEMBER 1936

The state of health of the
Daffodils
in the Netherlands

STATEMENT

of Professor Dr. E. van Slogteren, Official Representative
of the Netherlands Department of Agriculture and
Fisheries, at the public conference on the Bulb-nematode
before the United States Department of Agriculture
at

WASHINGTON, D. C., ON DECEMBER 15, 1936

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Introduction.

Acting upon instructions of our Minister of Agriculture and Fisheries, I have again come to your most interesting and beautiful country in order to give you every possible information concerning the health-condition of our bulbs as well as concerning our method of fighting diseases and our methods of cultivation.

I hope that you will find therein a justification for our request not to burden the importation of bulbs to such an extent that this import would become altogether impossible, being convinced at the same time that in order to protect the American agriculture and horticulture, such hindrances are not essential.

The question which faces us to-day is not the principle of quarantine in general, but more especially the nematode, even though it is obvious, that in applying quarantine regulations of whatever kind, we have to carefully consider the general foundation on which they all are based.

In referring to a few of these basic principles, it is not my intention to repeat what I have pointed out on former occasions or that which has been said since 1922 by my colleagues of America, Canada, England, France, Germany or by myself at the International Phytopathological conferences.

I shall confine myself altogether to a few quotations from the best scientific publication which was written about the efficacy and economic effects of plant quarantines and which has been published as bulletin No. 553 by the well known University of California at Berkeley.

This very thorough study of the problem was published in a booklet of 265 pages and was written by a Commission of seven American scientists of a high scientific reputation and therefore undoubtedly gives an unbiased opinion on the quarantine problem.

These men have come to the conclusion that Quarantine 37 is the very backbone of the protection of American agriculture. However, together with this statement they say: "Plant quarantines serve a useful purpose in preventing or delaying the spread of pests and diseases, provided they are maintained within reasonable biological and economic limits." (page 243).

These American scientists also state (see page 97):

"Intense pressure is often applied to quarantine officials for a plant quarantine that will protect commodities from outside competition. There is no more certain way to break down the entire quarantine system than to use it as a pretext to cover up some ulterior motive. Plant quarantines should never be used for any purpose other than the exclusion of pests and diseases."

On page 11 they say:

"The importance of a pest or disease is often grossly exaggerated. It is not strange that growers sometimes demand extreme quarantine measures under these conditions. Whatever may have been true in the past, the Committee believes there is no longer any justification for such exaggeration."

About the need for exchange of agricultural commodities, we read on page 82:

"The development of agriculture and horticulture in new countries and their improvement in old ones has very largely resulted from the exchange of plant material between countries. California horticulture, for instance, is based entirely upon species of fruit introduced from other states or countries, and even the most popular horticultural varieties are in many cases not of local origin but have been introduced from without the State. If the various fruits, vegetables and agricultural crops which are produced here are considered, it can readily be seen how much California agriculture has depended upon plant introduction from other parts of the United States as well as from Europe, Asia, Central and South America, and other parts of the world. From this point of view it is evident that the exclusion of plant diseases and pests by quarantining against nursery stock, seeds, or plants of certain kinds cannot be accepted as a desirable procedure without taking into account the interference with horticultural development which is thereby certain to occur. For this reason there has been developed considerable hostility and antagonism to plant quarantine among the very people whom such restrictions are intended to protect. If commercial traffic in fruit, cereal products and many other food materials is considered, it is easy to realize that plant materials which constitute the carriers of pests and diseases cannot be barred out of a country or district without thereby introducing many serious economic complications. Agriculture and horticulture cannot develop without an interchange of propagating material, nor can the world's commerce in agricultural products exist without incurring a possibility of the introduction of plant diseases and pests. The problem therefore is one of deciding how far it is possible to limit their spread without doing more harm than good to agriculture and commerce".

On page 248:

"The biological nature, and the probable direct and indirect economic effects of each new plant pest or disease, must be carefully compared and weighed against the probable direct and indirect effects of a quarantine against it. Only after such consideration is any one qualified to offer an intelligent opinion for or against a particular quarantine. Each quarantine should be considered on its own merits rather than on the merits of the whole system of quarantine procedure".

The opinion of these seven American scientists, who studied the quarantine problem very thoroughly especially with regard to the narcissus-problem, is to be found on page 41 as follows:

„The federal quarantine regulation that restricted imports of bulbs into the United States altered prices of bulbs in practically all exporting and importing countries. To evaluate properly the effects of such a quarantine it would be necessary to consider the losses to producers and gains to consumers in all foreign countries, the gains to producers in this country, and the losses from higher prices and gains from healthier bulbs to consumers in this country. Perhaps the disadvantage to producers in Europe far outweigh the gains to people of the United States. But what can the producers in Europe do about it? They can cease to grow bulbs, stop buying prunes, raisins, other fruit products, automobiles, and anything else from the United States and produce their own products or get along without them. This would tend to be the ultimate result, without any legislation, because they cannot buy unless they have something to offer in exchange. However, they may hasten the change by enacting tariffs, quotas, embargoes, and other measures to restrict imports. Finally, producers of export commodities in the United States are indirectly affected.

If the people of other countries are excluded from the concept of society and the effects of plant quarantines on them are not considered, then the analysis is unfair, and the people of this country are favored at the expense of foreigners”.

About the obligation to rescind plant quarantines they say on page 97:

„The use of police power for preventing the establishment of pests and diseases carries with it the obligation to rescind quarantines where they are no longer serving the purpose for which they were intended. It is incumbent on the quarantine executive to maintain at all times an intimate contact with the biological and economic conditions surrounding a quarantine, since these often change rapidly, sometimes in such a way as to render a quarantine which was entirely sound when enacted no longer justifiable”.

Page 98:

”If a State or country does not recognize the obligation to rescind a plant quarantine properly when its major usefulness is passed or when it ceases to be effective, it cannot expect and rightfully demand fair treatment in this regard from other states and countries”.

Argument:

I hope that you will excuse this rather lengthy introduction to my argument which I am going to set forth.

All that is being done in the United States of America is being done very thoroughly and we Europeans have the greatest admiration for your monumental buildings and skyscrapers. They certainly have to be built on a good foundation and for this reason I have tried to build my argument on a purely American sound foundation.

Besides the foregoing I could simply refer to my extended pleas at previous hearings, held in Washington.

However, it appears from the report of the Senate-hearing of March 17th, 1936 (S. 2983) that there exists a grave misunderstanding as well concerning the health-condition of our bulbs as to our methods of cultivation and the significance of the nematodes.

It is therefore that I want to bring first of all the following to your attention.

Concerning the origin of the nematodes in America, various stories have been told in America, however, none of them are based on scientific principles.

It has been said, for instance, that Alfalfa was infested in the United States by the narcissus eelworm. Every scientist knows that this is impossible because the eelworm disease of the Alfalfa dates much farther back than the one of the narcissus.

We know that nematodes occur all over the world and that it is absolutely useless to blame one another for having transmitted the disease from one country to another. I have, for instance, noticed nematodes in the wild strawberry plants along the Pacific Coast and it is highly probable that they have been there ever since there was in that section plant and animal life in that stage of evolution.

Eelworms occur all over the world in a large number of hosts and I believe that the different hosts of this pest present in the United States number about 200 and there is no reason whatsoever to assume that one particular race would be more dangerous to some cultivated plants than another race, for instance the one living in bulbs.

Once more and for the last time citing Bulletin 555 of the Berkeley University, a bulletin from which I have already so profusely quoted, we read on page 95:

"The argument is sometimes advanced that an insect may suddenly change its climatic requirements and thus become adapted to an environment in which it was formerly unable to exist. Such a possibility is so extremely remote as to eliminate it entirely from consideration as a basis for specific quarantine action."

The above statement made with reference to an insect applies just as well to any other parasite and the study of the biological races of all kinds of parasites and more especially the experiments on different races of bulb nematodes conducted by me on a large scale for as many as 20 years, do in no way indicate that a certain specialized race is readily transferred from one host to another. Exactly the opposite proved to be true and when my honored colleague Dr. Steiner informs us that such cases have been ascertained in Holland during the period 1888—92, he most probably refers to the experiments performed by Professor Ritzema Bos. The material used by the latter, however, was not very reliable, as I discovered when repeating his experiments; there are but very few scientists who still attach any value to these experiments of Ritzema Bos and after some 50 years no scientist did actually find any proof supporting his opinion.

The assertion that it is especially the bulb nematode that constitutes a greater danger to American crops than any of the innumerable other nematodes of such hosts as occur in a wild state in every section, does not rest on any scientific basis.

Furthermore allow me to refer to Dr. Steiner's viewpoint concerning the necessity of cutting up every bulb in order to ascertain that a shipment does not contain any nematode diseased bulbs. It will always be impossible to give absolute guarantee concerning any commercial shipment of any commodity and strict adherence to this academic standpoint would automatically

discontinue all exchange of products and would make international trade — without which no country can get along — simply an impossibility.

His standpoint, moreover, only seems theoretically to be more justified than it really is. A shipment containing diseased bulbs will invariably contain such bulbs suffering from variously advanced stages of the disease and if Dr. Steiner knows something of the skilfulness of inspectors of various bulbs he would be surprised to see how readily they ascertain even a slight degree of disease present in a shipment. This is the case with our inspectors and, no doubt will also be true with the men of your inspection service. They will certainly detect any material infestation.

A much greater assurance, however, is obtained when only such lots are considered for inspection for export as have previously been subjected to inspection in the field during the growing period and have thus found to be free from infestation.

In this way a degree of practical assurance of freedom of diseases is obtained which will comply with all claims that reasonably can be made and this is the basis of our export trade.

During the Senate hearings of March 17, 1936 a few arguments were put forth purporting to show that our narcissus are too diseased to be introduced into the United States.

These arguments mostly originate from Mr. Reynolds.

The latter does me the honor of quoting from a paper written by me and in which I express my regret that 20 H.A. of our narcissus are affected with disease to such an extent that they cannot be used for export.

In the first place I want to state that this paper was in no way a secret one but was mailed also to many of my American colleagues. The fact that I seriously warn against carelessness with respect to measures of control should rather be considered as proof of watchful attention to the healthy condition of our bulbs than as giving rise to any suspicion on your part.

Phytopathological literature and science probably are for more than 80 % of American origin; more than 80 % of the directions for control of plant diseases originated from American scientists but, does this justify the conclusion that more than 80 % of all plant diseases occur in America? You all know better.

However, a careful study of the figures mentioned by me in the paper in question will reveal that those 20 H.A. (about 50 acres) constitute just about 1 % of the whole area planted at that time with daffodils in our country. This also implies that at the time I wrote the paper, the stand of daffodils in 99 % of the total area devoted to that crop was such a healthy one that bulbs were considered fit for export.

It is, moreover, to be regretted that the person who translated my paper for Mr. Reynolds ended his quotation just before the following sentence:

"We can get rid of those infestations in one year by treating them correctly according to our instructions."

Mr. Reynolds assumes that this happened in 1931, notwithstanding the fact that it is clearly indicated that the paper was published during the summer of 1930 and at the time he assumed I gave that warning, we had controlled the infestation by far the larger part and now it is again six years later.

In order to prevent any possible misunderstanding I have moreover most

emphatically to add that the fact that I was of opinion that 20 H.A. or 1 % of our bulbs were not suitable for export by no means implies that all these bulbs were diseased.

Even when in the case in a stock of daffodils we find in each bed or in each 2 beds in the field 1 per 1000 of diseased bulbs, the plants are considered not suitable for export.

Mr. Reynolds by way of comparing the difference in health of Dutch narcissus and those in the far West refers to a stock that was imported by a certain firm from Holland and that proved to contain 7000 diseased bulbs out of about 15,000.

I hate to speak of this case. But if I did not speak of it you possibly might assume that I accepted those facts and this I certainly cannot do. There is something wrong in this case!

Even for a reward of a million dollars I would have to try in vain to find in Holland such a diseased lot of daffodils and then to have it passed by the inspectors of our inspection service. This service does not belong to my domain, but I have the highest respect for the way those men are doing their duty.

Also in another respect these bulbs were very remarkable bulbs. Mr. Reynolds points out that those bulbs must have been infected already two years before they were shipped from Holland. I certainly would be very glad to know how he discovered this. I know something about your cultural methods and the course of bulb diseases in your country, but having lived now for about 20 years in the center of our bulb district, I can declare upon my word of honor that I never have seen a jonquil narcissus that was not entirely destroyed after having suffered from the eelworm disease in our country for as long a period as two years.

There are just a few explanations of this case which I do not like to mention, but this particular case should never be considered as evidence of the condition of health of our Dutch narcissus culture.

A few more remarks were made during the Senate hearing of March 17, '36:

It was claimed that our method of treatment was not efficient enough and was inferior to your method of treatment.

Giving due honor to my colleague Mr. Ramsbottom, who started to work on narcissus diseases a year earlier than I did and also treated the bulbs a year before I did, I certainly have the right to claim to be the father or the mother, as you like it, of the hot water treatment of daffodils. Gladly letting him be the other parent.

I performed thousands upon thousands of experiments and as early as 1918-1919 determined temperature and time of exposure of the hot water treatment necessary for killing all eelworms infesting bulbs of all sizes and such with reference to our climatic conditions.

I have published the results in different papers, have given you in 1922 and 1925 all the information you wanted and in 1926 I have even delivered a number of lectures for scientific colleagues and for bulb growers on the West Coast. Probably this was before Mr. Reynolds had been in the bulb growing district, but I have still here with me the same lantern slides which I showed to the growers in Puyallup, Oregon and in California in 1926 and from this you will see that we never have considered a 2½ hour treatment sufficient for

the killing of eelworms under our climatic conditions. If Mr. Reynolds had had before him a complete translation of the publication from which he quoted on March 17, 1936 he would have found there on page 7 my advice to give bulbs larger than salable Golden Spur a treatment of 4 hours at $43\frac{1}{2}^{\circ}$ C.

He could also have found there the advice regarding the addition of different chemicals to the water as we had already applied before that time. Regarding pre-soaking I can state that it is my experience based on a great many of laboratory experiments, that eelworms that had been completely dried out can stand a higher temperature and longer exposure. I fully understand that with respect to your climate you will perhaps have to reckon with this, but you will understand that in our moist climate which is not so warm, the bulbs are lifted much later and that the period between the time of lifting and the moment of treatment is not such a long one. It is for this reason that under our conditions we do not need this pre-soaking of bulbs grown in Holland.

I probably have taken already too much of your time; just one more fact. A statement has been made to the effect that we do not have an area large enough for sufficient rotation of our daffodil crops. The man who made this statement had to answer your Senator Murphy that all the knowledge he had of our culture was obtained from a few circulars that had been translated for him.

Please send some of your most critical men and let them look themselves, I shall show them every detail of our culture just as I have done before for hundreds of scientists from abroad during the last 20 years. We have to conceal nothing and they may as well go by themselves wherever they want to look.

In what was perhaps one of the worst of the last 15 years (1930) about 1 % of our narcissus fields was infested to a certain extent.

In accordance with the regulation of our Government we had to reduce the area planted with daffodils in 1932 to 50 % of the area of the year before and until now we have not been allowed to enlarge the planted area. For this reason we have much more non-infested soil than we need. But another point is that in our fields and by our methods of deep-trenching we are able to disinfect our soil in just one year. Since 1919 I have sent a copy of all our publications to my colleagues in the United States and also to the library of the Department of Agriculture.

There are a lot of stories about the survival of nematodes in the soil for a long period, but most of them are just stories and especially in our humid climate we can get rid of nematodes in the soil in a very short time. But it certainly takes more labor and for this reason we are obliged to keep production costs down, to give all possible care to our cultural methods in our own interest and this we certainly do. For this reason it is that every bulb and even every leaf of a bulb is inspected separately many times during the growing season and if there is only the slightest reason for suspecting a plant it is, together with the surrounding soil, taken out of the ground as well as the surrounding bulbs, even when they appear to be perfectly healthy. We know that this method of bulb culture pays best in the long run and knowing the course of the disease, knowing our methods of culture and the methods applied in all other bulb producing countries, I am certain that nobody can beat us in producing a more healthy crop of daffodils than we

do. I certainly hope you will equal us and every improvement of our methods of culture we as gladly place at your disposal as we shall be glad for every information we get from you. On this basis international cooperation in scientific research will be possible.

As I already stated eelworm infestation is present only to a very small percentage in our bulb fields. If it is in any way possible to improve the distribution of our bulbs, thus giving you a still greater certainty that no bulbs with eelworms will arrive here, we kindly ask your cooperation.

A supplementary law has just passed the Administration of our Department of Agriculture and will be effective very shortly, giving us all authority to make sure of all elusions of the regulations that may be detrimental to the reputation of our crops.

Until now I discussed exclusively our narcissus culture. Our hyacinth culture certainly is in as healthy a condition or if possible still healthier than our daffodil culture. On account of the method of vegetative propagation it is even easier to multiply quickly a stock of healthy hyacinths. Therefore there is as little phytopathologically justified reason for the exclusion of our hyacinths as there is for the exclusion of our daffodils.

Regarding the tulips I have to say that in the course of 20 years neither I nor any of my assistants have ever seen a tulip affected with eelworm and still for morphological, biochemical as well as for phytopathological investigations we cut every year thousands and thousands of tulips. I know that somewhere in the literature mention is made of a few cases of eelworms found in tulips, but of one fact I am sure: Up to the very moment I left Holland, about 14 days ago there did not exist any eelworm disease of tulips in the Netherlands.

I have to finish my argument now. I am submitting, together with a copy of this address, a list of about 55 publications from our laboratory dealing with flower bulb culture and gladly will give, if necessary, also after this conference any additional information you may want.

It was proposed to sterilize all bulbs possibly affected with eelworms before entering this country. I hope you will understand my standpoint on this proposition. This treatment was built up for the greater part on my work and we have found that due to this treatment the eelworm is no longer of any material danger to the bulb culture. The treatment, however, is especially meant for planting stock, the propagating material and by hard and strenuous work during about the last 20 years, I have shown that the effect of the treatment on the growing and flowering capacity largely depends on what we call the pre-treatment and after-treatment, e.g. the storage conditions before and after the hot water bath. For the greater part of the bulbs the time of arrival in your harbors is not the best time for treatment especially with regard to their flowering capacity. Most of the bulbs will just be killed or become worthless if they have to be treated after a long journey at the time of arrival. Tulips certainly cannot stand any treatment needed to kill eelworms in them, quite apart from the fact that they never are infested with this pest. Hyacinths surely will not flower satisfactorily after treatment in

this country and the same will be the case with daffodils, lilies and most other bulbs.

Why not benefit by the results of scientific research, results that eliminate any possible danger to the culture of flower bulbs by treating, if needed, the planting material; and why prescribe this treatment for the salable products of the bulb producing industries and make them practically worthless for commercial purposes without any phytopathological necessity?

We have no objection whatsoever if you destroy every lot of daffodils that shows any really material infestation with nematodes.

Conclusions:

In the foregoing statement of facts, I hope to have made clear, amongst others, the following points:

- First:** that the worlds commerce in agricultural products cannot exist without incurring a possibility of the introduction of plant diseases and pests.
- Second:** that any quarantine as an embargo or anything to the similar effect only economically as well as scientifically is justified to prevent the introduction or spread of a dangerous plant disease or insect infestation new to or not theretofore widely prevalent or distributed throughout the country.
- Third:** that the nematode is widely spread all over the world and found in a great number of hosts in **every** country.
- Fourth:** that the bulb nematode does not constitute any menace to any other crop.
- Fifth:** that phytopathological research has made it possible to fight the bulb nematodes effectively in the crops.
- Sixth:** that the health conditions of the bulbs imported from the Netherlands do not justify the suggested hot-water-treatment of all bulbs imported into the United States of America.
- Seventh:** that this suggested hot-water-treatment for our bulbs will have the same effect as an embargo.
- Eighth:** that therefore drastic measures such as the hot-water-treatment of all bulbs imported into your country cannot be considered as justified from a phytopathological point of view.

If notwithstanding these facts your daffodil growers are still afraid of infecting their planting stocks by means of our bulbs, a fear that it not justifiable, let them cook the bulbs they need as propagating material if it pleases them. There is no objection to that treatment as far as daffodil bulbs are concerned, when used for propagating purposes.

On the other hand, however, I hope to have made clear that the treatment in question is not phytopathologically justified as a general measure and that therefore it should not, in my opinion, be applied in a manner which would deprive those numerous **other** groups who want them for their homes and gardens.