

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
FRUIT AND VEGETABLE DIVISION
FRESH PRODUCTS STANDARDIZATION AND INSPECTION BRANCH

SHIPPING POINT INSPECTION HANDBOOK

FOR

SPINACH FOR PROCESSING

Washington, D. C.

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For Use of Fresh Fruit and Vegetable Inspectors

Agriculture - Washington

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INTRODUCTION

Spinach grown for processing is a sizable industry and has increased (1)
in recent years due to the trend toward the frozen pack and to the large
baby food pack put up annually. In 1956, 138,670 tons of spinach was pro-
duced for processing by California, Oklahoma, Texas, Arkansas, Washington
and New York. The states are listed in the order of their importance.
The Eastern Shore, including Virginia, Maryland and Delaware, also has
sizable acreage for spinach for processing.

Buying and selling on the basis of uniform standards encourages (2)
better production and better handling methods. The practice of paying a
flat price for all spinach which is accepted discriminates against the
best growers. The grower should be paid a suitable premium for spinach
which will make a manufactured product of highest quality. Likewise the
grower should be penalized for the delivery of low quality spinach.

INSPECTORS' S RESPONSIBILITY

Contracts may stipulate a certain price per ton for U. S. No. 1, a (3)
lower price for U. S. No. 2, and nothing for unclassified spinach. There-
fore, it is the duty of the inspector to determine the grade of spinach
for all loads or lots delivered to receiving stations, processing plants
or loading stations and to report each classification on the inspection
memoranda. These classifications furnish the basis for settlement for the
loads.

Processors may reserve the right, by contract, to reject all loads of (4)
spinach that fail to meet the U. S. No. 1 and U. S. No. 2 grades. The
Inspection Service has no authority to reject loads that fail to meet con-
tract specifications. The inspector should report to the field man or
yard foreman loads which fail to meet contract specifications. It is then
the processor's responsibility to reject such loads.

The inspector is to be guided by the instructions in this handbook (5)
and by any additional instructions which may be given to him, either
verbally or in writing, by his supervisor. In the conduct of his work,
however, he may encounter problems which are not fully covered by such
instructions. In such instances, he should contact the supervisor by

telephone for further instructions. If it is necessary to take immediate action, he must use his best judgment and immediately advise his supervisor of the action taken in order that corrective measures can be taken if the proper course was not followed.

APPLICATION OF STANDARDS

- (6) Due to the manner in which the grades are constructed it is impossible to certify percentages of U. S. No. 1 or U. S. No. 2 quality. The main reason for this is that limiting tolerances are by count in some instances and are by weight in others.

INSPECTION EQUIPMENT

- (7)
1. Inspection Memoranda.
 2. Grading table or other suitable table (approximately 3 feet wide by 5 feet long and of suitable height).
 3. Sampling containers for gathering a composite sample from load.
 4. Four or five small containers for holding the various classes of defects. (Each container should be plainly labeled with the names of the defects for which it is intended).
 5. One set of scales that will weigh from one to one hundred ounces.
 6. Water bucket for washing hands.
 7. Towels for drying hands.

SAMPLING

- (8) Representative Sampling. Too much emphasis cannot be placed on the importance of the inspector obtaining representative samples from loads of spinach. He may be able to grade spinach perfectly, but unless the sample is representative of the load the inspection is not correct. He should at all times keep in mind that the grade reported in the memorandum determines the amount of money the grower will receive and the processor will pay for the load. Therefore, if his sample is not representative the settlement cannot be equitable.

- (9) Some processors may furnish helpers to obtain samples from the conveyance, empty spinach on the grading table and other related duties. Such assistance from helpers is often necessary if the inspector is to keep up with the deliveries. Although these helpers are expected to do the manual labor, it is the responsibility of the inspector to select representative samples.

- (10) He should always remember that he, and not the helper, signs the inspection memorandum. Regardless of how competent the helper may be, the inspector must not allow him to draw a sample from a load without close supervision. Make sure that the sample drawn is representative of the load.

The processor may employ helpers to assist the inspector, and many growers may get the impression that these men are working for the interest of their employers unless the inspector, by his actions, lets it be known that he is supervising the drawing of the sample. The inspector should not hesitate to tell helpers to draw additional samples from more containers. (11)

The inspector will have to be guided by the type of loading in setting up a procedure for sampling. Spinach is normally bulk loaded onto trucks or packed into field crates for delivery to the plant or receiving station. Used bushel baskets and other wooden containers are sometimes used. Also, large wire-bound field boxes that hold approximately 23 or 24 bushels are used in field loading. (12)

In the case of spinach packed in containers, about one handful of spinach should be taken from a minimum of 10 or 12 containers from various parts of the load. In the case of bulk loaded spinach the samples should be taken as the truck is being loaded or unloaded. In the latter loading, handfuls of spinach should be taken throughout all parts of the load. A round stave bushel basket is a convenient container into which to place the composite sample of spinach. After thorough mixing, a representative sample of a minimum of 100 ounces of spinach is weighed into another container for grading. In case of very large loads the composite sample should consist of spinach from more than 12 containers and the sample for grading should be larger than 100 ounces. (13)

In handling the spinach care should be taken to avoid shaking out loose dirt, muck or wood chips or other foreign material. (14)

Because of the small sample taken for examination it is absolutely necessary that it shall be representative of the quality and condition of the whole load. (15)

Grading Samples Selected by Other Parties. In some cases, growers bring in loads after the inspection platform has closed and the inspector has gone for the day, and one of the processor's employees draws the sample to be graded the following day. It is obvious that the inspector should not grade and certify to the quality of such sample as being "sample of the lot herein described" when he has never seen the lot and the quality may have materially changed during the night. However, he may inspect and certify to the grade of sample drawn by other parties and it is up to the processor and grower whether settlement for the load will be made on the basis of inspection of the sample. In all such cases, the inspector should show the number of containers he inspected in the blank marked "Number of Containers" and not the number of containers reported to be in the load from which they supposedly were drawn. In addition, he should make the following statement under "Remarks": "This memo restricted to _____ crates (or other containers) not official sample." (16)

- (17) Irregularity in Loads. If the quality of the spinach in the load or lot appears to be irregular to the inspector, he may take additional composite samples, averaging the results of all samples together. The resulting grade would be the grade reported on the inspection memorandum.
- (18) The Inspection Service should have a definite understanding with the processor to the effect that he may send back a load for regrading if in the process of unloading it is shown that there is a material difference between the upper and lower portions of the load. The same privilege should also be extended to a grower if he feels that he has better spinach in the bottom of his load.
- (19) In some instances the load may be sent back to the inspection platform for the examination of portions not accessible for sampling at the time of the first inspection. If the portion of the load returned for re-sampling is to be weighed, a new memorandum should be issued on this portion of the load, and treated as a new inspection without reference to the first inspection. The number of containers shown on the first memorandum should be reduced to agree with the number unloaded before the second weighing.
- (20) Some processors may stipulate in their contracts with the growers that loads showing a material difference in quality of the spinach in the lower portion of the load from that in the upper portion may be reweighed and sent back to the grading platform for a grading of the lower portion.

INSPECTION PROCEDURE

- (21) Adherence to Contract Specifications. The inspector should obtain a copy of the contract between the processor and grower from the processing plant and become thoroughly familiar with it before inspection is started.
- (22) Quite frequently processors will deviate from their contract specifications. Some processors may even request the inspector to notify the growers of the deviation from the contract specifications. In no case should the inspector or Inspection Service assume the processor's responsibility of notifying the growers of the variation from or return to the contract specifications. However, the Inspection Service should always insist that the processor notify the central Inspection Office within the State in writing of any change from the contract, or a return to the contract specifications once it has been changed. Such changes in specifications should also be posted at the inspector's platform. The Supervisor should instruct the inspector in the methods of handling such changes and inform him regarding the proper notation to be placed on the memorandum to cover any deviations from the grades.
- (23) Inspection Under Artificial Light. In some processing plants, in order to handle the volume, it may be necessary to inspect spinach under artificial light. The Inspection Service should insist on the proper lighting facilities for both the grading table and the place where the loads are to be sampled. In circumstances of this kind, the inspector should consult with the Supervising Inspector regarding proper lighting facilities.

Sorting the Sample. The procedure in grading the sample may vary from area to area depending upon equipment at hand and local conditions, but the following general procedure should be followed. (24)

After the 100 ounce composite sample has been taken from the basket, the sample is dumped onto the grading table. Experience has demonstrated that it is good practice to first pick out the good spinach. Place this spinach into the container from which the sample was taken. Place the defective spinach and foreign material into the proper containers as follows: (25)

(1) Decay, mildew, grass, small weeds and leaves which are damaged by discoloration. These defects must be counted. The U. S. No. 1 grade allows a total of 20 pieces of this material but limits decay, grass and small weeds to 15 pieces. The U. S. No. 2 grade permits a total of 40 pieces with no limitations for any factor or group of factors. (26)

(2) Wood, muck chips, or other foreign material. These defects must be counted. All pieces of hard foreign material noted above which are more than 1/2 inch long should be placed in one container. The U. S. No. 1 grade permits 2 such pieces and the U. S. No. 2 grade permits 3 such pieces. Pieces less than 1/2 inch should be left on the table to be scored along with foreign material not over 1/2 inch in length. (27)

(3) Roots, large weeds, seedstems, seedbuds, coarse stalks and stems, disease other than decay and mildew, insects other than worms, spray residue, adhering dirt, foreign material not over 1/2 inch in length, or mechanical or other means. These defects must be weighed. The U. S. No. 1 grade permits 5 ounces of such factors and the U. S. No. 2 grade permits 10 ounces (all based on the 100 ounce sample). (28)

(4) Spinach affected with worms. When worms are noted, the whole plant or individual leaf is scored, by count. Any lot of spinach which has even one leaf or plant affected with worms shall be reported on the certificate as unclassified. (29)

GRADE INTERPRETATION

(The only difference between the U. S. No. 1 and U. S. No. 2 grades is increased tolerances for the U. S. No. 2 grade).

Stemmy Spinach. Too many long stems in relation to the length of the leaf blades affect the processing quality of the spinach. Stemmy spinach in the canned and whole frozen product is often referred to as "spaghetti". Too many stems in the chopped and frozen product gives the spinach a grayish color. The U. S. Standards require that for both U. S. No. 1 and U. S. No. 2 grades, not more than 25%, by weight, of the spinach in any lot may consist of leaf stems. This factor is determined by breaking the (30)

stem free from the leaf blade and weighing the stems. As a general guide, the 100 ounce composite sample drawn for the inspection of the lot or load would be of sufficient quantity for running the test.

- (31) It is not intended that the inspector should go through the above procedure for every lot or load inspected. Through experience he can soon judge by the appearance of the lot whether or not it fails to grade U. S. No. 1 or U. S. No. 2 account of excessive stems. At the start of the season the inspector should break off the stems and weigh them to get experience, and later break off and weigh the stems on all loads and lots that appear to be close.
- (32) Decay and Mildew. All visible mildew and decay is scored in the U. S. No. 1 and U. S. No. 2 grades. Only affected leaves should be scored and not the whole plant. When Downey Mildew develops in fields it can ruin entire loads for processing and fields are often abandoned. Inspectors should check lots carefully for first development of this defect.
- (33) Grass and Weeds. All pieces of grass are picked out of the sample and scored. Weeds which are 4 inches or less in length are also picked out and scored on a count basis, while all weeds over 4 inches in length are scored on a weight basis.
- (34) Discoloration of the Blades. Freedom from discoloration is very important in spinach for processing. The leaf blades are damaged by discoloration when the appearance or processing quality is materially affected by a brown or yellow color. Heart leaves which show a normal yellowish cast are not to be considered as damaged.
- (35) One of the chief defects of spinach is leaves which are damaged by yellowing. Spinach leaves which have a yellowish cast seriously affect the appearance of the finished product. It is rather difficult to draw a line on when the leaf should be scored as yellow but when the yellow color seems to predominate over the green to the extent that it is readily noticeable, and the appearance of the leaf is materially affected, it should be scored.
- (36) Discoloration of Stalk and Stems. At times the stem or stalks of cut leaf spinach grown on muck land may show a brownish or blackish discoloration at the base of the stems. This is primarily due to the dirt being rubbed into the base of the stems at the point where the stems have been clipped. The discoloration resulting from this factor is quite serious since it cannot be removed in the normal washing process in the preparation for use. The grade states that when this condition materially affects the appearance or processing quality, the spinach should be scored.
- (37) Another type of discoloration is the pink or red color at the base of the stems, and point of attachment to the plant and generally right next to the ground or under ground. Although this discoloration is characteristic of the spinach it will not blanch out and lots of spinach having reddish colored stems are discounted by processors. Also the presence of pink stalks and stems is an indication of poor harvesting practices in that the spinach has been cut too close to the ground. An excessive amount of

foreign material along with dried, brown and yellow leaves, generally found at the base of the spinach plants, may be present in such lots. According to the grade, stalks or stems which show more than a tinge of pink or red color should be scored.

Coarse Stalks and Stems. All coarse stalks and stems are scored against the grades. The ease by which the spinach stalks and stems may be broken will give the inspector some idea as to the coarseness or toughness of the spinach. (38)

Seedstems and Seedbuds. As the grade states, all seedstems are scored when seedbuds have formed and are plainly visible. Loose seedbuds are also objectionable and those more than 1/2 inch in length are scored. (39)

Insects. As mentioned previously, the standards permit no worms, and when any worm is found the load becomes unclassified. The standards require that the No. 1 and No. 2 grades be free from damage by other insects. Slight infestation by aphids shall not be considered as damage. As a general guide, 25 or less aphids per ounce shall be considered slightly infested. When aphids exceed the above amounts the spinach is damaged by aphids. (40)

Spray Residue, Adhering Dirt. There is no intent to be too technical when judging whether individual leaves are damaged by these factors. The grade states that the spinach is damaged when the above materials cannot be removed in the normal commercial washing process. If at all possible, the inspector should observe the factory process in washing the spinach. If this is impossible, the inspector should try washing spinach leaves that have adhering caked dirt or spray residue. He should be guided by the ease with which such material is removed in deciding whether to score the spinach as being damaged. (41)

Mechanical Injury. This category is handled under the general definition of damage. The inspector should be careful to not be too technical on this factor, since mechanically harvested spinach is handled quite roughly. This factor is not too important to those processors who are chopping spinach. (42)

Other Defects. Other defects should be handled under the general definition of damage and serious damage. (43)

INSPECTION MEMORANDUM

Care of Memoranda. Inspectors should take necessary precautions to prevent blank memoranda from falling into hands of persons who have no right to use them. Each inspector shall be held responsible for the return of all unused memoranda to the Supervising Inspector or inspection office at the close of the season or deal. (44)

Inspectors will receive specific instructions from the Supervising Inspector with reference to mailing the copy of the memorandum to the inspection office. Some States desire these mailed daily, while others may make different arrangements. (45)

- (46) Care in Recording. The memorandum must be easily legible. All data recorded during the process of inspection should be complete, neat in appearance, and clear. All computations should be checked carefully for errors. Inspectors will be held responsible for figures being legible on all copies of the memorandum. Remember that the original memorandum is sometimes lost, and then it becomes absolutely necessary to use the carbon copies.
- (47) Correct Numbers and Name. Most of the processors furnish the growers with a book of forms which are to be filled in by the growers on each load delivered. These forms give the name of grower, date, and number of packages in the individual load. The inspector will transpose this information from this form to the memorandum. No excuse will be accepted for failure to record this information correctly on the memorandum. The memoranda are numbered and may be padded in book form.
- (48) Name of Place, Processor, Grower and Date. The name of the place where the inspection is made, name of processor and grower, time of inspection and date should be filled in on the memorandum just before starting the inspection, or immediately after the inspection is made. The weight of the sample to be graded may also be entered at this time. Care should be taken that this is always filled in as the inspection report would be worthless without the weight of the sample noted. Where the processor has obtained authority from Washington to print a supply of inspection memoranda to be used in their inspections, it will not be necessary to write in the name of the processor for it appears on the face of the memoranda.
- (49) Recording Counts and Weights. After the defects have been sorted into the proper containers they should be counted or weighed and entered in the proper place as designated on the certificate. Weights are taken only for securing the total weight of the graded sample and for weighing defects such as roots, large weeds and spinach damaged by seedstems, etc.
- (50) Signing of Inspection Memorandum. The inspector shall sign the memorandum with his full name, or the initials of his given name, and his last name in full. This warning is given because some new inspectors have been found to either initial or simply sign the last name to the memorandum. Legally either of these signatures would be worthless.
- (51) Issuing Restricted Memos on Large Loads at Receiving Stations Where it is not Possible to Obtain Samples in all Parts of Loads. Memos restricting the inspection to certain portions of loads may be issued only at receiving stations located at considerable distances from the processing plant on large loads where the processor refuses, or is unwilling, to make the load accessible. Such is the case when the processor has the inspection made at outlying receiving stations and then hauls the spinach some distance to his processing plant. Naturally, it is usually not practicable to break down large loads to the point of making all parts accessible for sampling before the long haul to the plant. In such instances, therefore, inspectors may issue memos restricting the inspection to the accessible portion of the load and stating what portion of the load is restricted. Inspectors

located at processing plants should under no circumstances issue restricted memos on any loads as it is always possible for them to obtain representative samples in one way or another either before or during the process of unloading.

Correcting Inspection Memoranda. If the corrections are not too conspicuous, minor mistakes which would not affect the credibility of the memorandum if presented in court may be changed by crossing out the part in error, and inserting the correct information. No corrections should be made on any memorandum unless the inspector has all copies so that all may be corrected at the same time. Whenever an error has been discovered, and the inspector does not have all copies of the memorandum, a new memorandum should be issued upon which the following statement should be made: (52)

"This memorandum supersedes Memorandum No. _____, which is in error."

No attempt should be made to erase errors on memoranda. All corrections should be initialed to show the authority for the correction. (53)

Distribution of Memorandum Copies. The distribution of the original memorandum and one copy will depend on the arrangements made by the party requesting the inspection. In most cases this party will be the processor. In all probability, he will request that the inspector give the original and one copy to the grower, who will then present these documents to the processor along with the load. The processor usually keeps the original and gives the copy to the grower for his files. The second carbon copy is retained by the inspection office for the current year plus one. (54)

APPEAL INSPECTIONS

Either the grower or the processor may appeal from the inspector's findings. The appeal may be based on either (1) the sampling, or (2) the grading of the sample. (55)

(1) Appeal on Sampling. In some cases, the growers or processors may question the accuracy of the inspection owing to the irregularity of quality in the various containers. (56)

In most cases where the grower or processor questions the accuracy of a report, it is not the grade interpretation that is in question but the sampling. Regardless of how careful the inspector is in sampling loads, there will be an occasional load in which the samples will not accurately represent its true quality. From this standpoint, it is necessary to admit the possibility of error in sampling loads of irregular quality. (57)

When the grower or processor questions the accuracy of the inspector, it will be permissible for the same inspector to draw another sample for analysis. This sample should be inspected, and the results of the two inspections combined into a weighted average on a new memorandum. The first memorandum, if issued, should be voided. (58)

- (59) (2) Appeal on Grading. If either the processor or grower questions the accuracy of an inspector's report because of grade interpretation, he may request an appeal inspection to verify his contention. Such a request usually cannot be granted at outlying plants or receiving stations where only one inspector is located unless a Keyman or Supervising Inspector happens to be in the immediate vicinity. If either one of the latter is not available, the inspector should endeavor to adjust the difficulty, perhaps by taking additional samples and giving a detailed explanation of the reasons for his scoring. If a processor or grower is still not satisfied with the inspector's interpretation of grade factors, it is, of course, his privilege to notify the inspector or Supervising Inspector of this dissatisfaction and it then becomes the duty of the Supervisor to take such steps as he deems necessary to correct the situation. If an inspector is in doubt as to whether some of his grade interpretations are correct, he should so notify his Supervisor and request an early check-up of his grade interpretations.
- (60) The memorandum issued on an appeal inspection by a Supervisor or Keyman upon request of either a grower or processor should include only the results of the second examination. In other words, results of the appeal inspection should never be averaged with those obtained and reported on the first memorandum by the first inspector.
- (61) When Second Inspection Not an Appeal. If a considerable period of time has elapsed since the first inspection was made, or the load has been out of the inspection yard, a second inspection should be treated as a new inspection and no reference should be made to the first memorandum. This procedure is necessary in the inspection of spinach for processing, as it wilts very rapidly during the processing season, particularly during periods of hot weather.
- (62) Number of Containers to be Sampled on Appeal or Second Inspections. The number of containers to be sampled in case of an appeal or second inspection will depend upon the uniformity of the lot in question and the character of the defects. If the load shows considerable irregularity, double the usual number should be sampled. If the quality is relatively uniform in the different containers, and it is only a question of proper interpretation of certain quality factors, it may be sufficient to sample the same number of containers.

SHORT GRADE FORM FOR CANNERY SPINACH, 1956			
Defects	U. S. No. 1	U. S. No. 2	Unclassified
Decay, mildew, grass small weeds, discolored leaves.	Not over 20 pieces (not over 15 pieces for decay, grass, small weeds)	Not over 40 pieces	Spinach which does not conform to requirements of any of the foregoing grades
Damage by wood, muck chips, or other hard foreign material.	Not more than 2 pieces over 1/2 inch long.	Not more than 3 pieces over 1/2 inch long.	
Roots, large weeds & damage by seedstems, other discoloration, seedbuds, coarse stalks and stems, other disease, other insects, spray residue, dirt or other foreign material.	Not over 5 ounces	Not over 10 ounces	
Plants affected with worms	None permitted	None permitted	
Leaf-stems	Not more than 25% by weight, of the spinach in any lot may consist of leaf-stems	Same requirements as U. S. No. 1	

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