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#### THESIS

bу

HARRY HENDERSON.

Agricultural Collège,

Michigan.

May, 30, 1902.

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THESIS

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Variations in Radish Types.

The coject of this work is to determine if radishes show deviations or variations in their shape.

Some sixty four varieties of the radishes were used,
They were received from Burpee, Henderson, Landreth,
Dreer & Ferry: and are listed and described here in.
These were divided into groups according to shape, as:
Turnips, Olivea, Half-longs, and longs. They were planted in a bench, forty feet long, three feet wide, and
six inches deep filled with a rich clay loam. The first
two groups were planted, two rows for each variety, four
inches between the rows and plants thinned out to two
inches. The last two groups were planted, one row to each
variety, five inches between rows and plants thinned out
to two inches.

Drawings were made from each variety from time of appearance of first character leaf to maturity, about one week intervening between drawings, These were inked, especial care being taken with roots, at the expence of the tops, perhaps, but the result has been fairly successful.

The results have been good as shown by the table and drawings, only four or five failed utterly. The rest were satisfactory and the radishes for the greater number

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had but a small percentage of variation. The drawings and tables will tell the rest.

No. 1. Landreth's earliest.

The earliest sort, red, leaves exceedingly small.

A sort well adapted for forcing under glass.

Did very poorly, none coming to maturity and only ten seeds germinating.

No. 2. Rapid forcing from Henderson's.

Resembles white tipped scarlet turnip except it is smaller and grows more quickly. Good for forcing.

White t.s. forcing. Medium size, uniform shape, color bright scarlet sharply contrasted with white tips, grows quickly.

No. 3. Burpee's earliest scarlet button.

This sort was introduced in 1937. Finest strain of small, very early, round, skin bright scarlet, flesh pure white, crisp, tender and mild in flavor. Small quantity of top. Well suited for growing under glass.

No. 4. Red Forcing. H.

One of the earliest. Color bright red, root round

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tops very small, very mild flavor.

Wo. 5: Early deep searlet Turnip forcing. F.

Has as small a top and is as early as any variety in cultivation. One of the best for forcing. May be had in three weeks. Roots small globular, deep rich in color: flesh white, crisp and tender when young. May be planted closely owing to small tops.

No. 6. Extra early scarlet turnip. B.

Very quick growth, small round roots of rich
dark scarlet.

No. 7. Earliest scarlet erfurt turnip. L.

Among the quickest maturing of red turnip radishes. Small root and small top. An excellent forcing variety.

No. 9. Early scarlet turnip. F.

Small red round turnip with small top. Very quick growth. Rich color and crisp tender flesh. Desirable for forcing or out door planting.

No. 9. Early deep scarlet turnip. L.
Rich color, smooth skin. See variety No. 5(

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No. 10. Early round deep scarlet. F.

Similar in form to No. 8, but darker in color. Flesh white and very crisp and tender, top small. Well adapted for growing in frames.

No. 11. Early round dark searlet. B.

Small round roots of very quick growth: color deep bright scarlet.

No. 12. Dark Red Ball. B.

Deep scarlet turnip forcing radish, quick growing.

No. 13. Early scarlet Prussian globe. L.

Small leaved variety well adapted for forcing under glass. Root round, carmine, very attractive for forcing.

No. 14. New Triumph. B.

Extra early spring or forcing variety of distinct coloring. Small round white scarlet striped, fine crisp flavor.

No. 15. Triumph. H.

Globe shaped, solid, crisp and tender, rapid

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growth very early. Outside color white splashed with scarlet. A most attractive variety.

No. 16. Triumph scarlet striped forcing. B.

A good forcing variety. The roots are about the size and shape of Scarlet turnip white tipped forcing.

(No. 22.) Creamy white beautifully marked with spets and stripes of scarlet. The tops are small. The roots mature as early as any in cultivation. Desirable for its beauty, earliness and good quality.

No. 17 Early garnet turnip rooted. L.

Earliest red rooted radish. Earliness in maturity, for table use surpassing any other red sort. Rich red color unsurpassed by any other variety. In form it is turnip shaped. In size and form similar to the Early Scarlet. The leaves very short and small, fit for forcing in glass house or frame.

No. 18. Extra Early (ruby pearl). B.

A very small handsome variety, quick growth. Very bright red skin with distinct white tip. Flesh crisp and mildly pungent. An exceptionally attractive variety

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in appearance and well suited for forcing unior glass.

No. 19. Extra early white tipped forcing. L.

Maturing for table two days ahead of White tipped scarlet.

No. 20. White tipped scarlet ball. B.

A small round turnip shaped radish of bright scarlet: clear whit tip. It grows quickly.

No. 21: White tipped scarlet gen. D.

Excellent for forcing, short leaves, bright scarlet with white tip.

No. 22. Early scarlet turnip white tipped forcing.F.

Beautiful variety deep scarlet with a white tip.

As early as Non plus ultra, (see No. 5(). Has a small top and may be planted as closely, is more attractive in appearance. Cannot fail to satisfaction as a forcing radiah. Sold also as (23) and Rapid forcing No. 2.

No. 23. Scarlet turnip white tip. B.

See No. 22.

This is the standard early white variety for growing under glass to produce the small "Cherry Stone" radishes. Roots round bright sourlet with distinct white tips and crisp snowy whit flesh.

No. 24. Golden Dresdon. B.

An early small round variety having rich golden skin. Slightly later than the scarlet varieties.

No. 25: Early white turnip rooted. F.

A little flatter than the Scarlet turnip rooted No. 8. and pure white in color. Very small top, white semi-transparent flesh and is slightly later than scarlet turnip, but will stand more heat and remain longer in condition for use.

No. 26. Large White Globe. B.

Roots two inches in diameter, skin smooth creamy white with crisp mild white flesh. Will stand for some time after reaching full size without becoming pithy or running to seed.

No. 27: Philadelphia white Box. B.

Early variety. Roots one and one half inches in diameter, pure paper white skin, crisp mild flesh. Runs quickly to seed. Planted for earliest market.

No. 28. Burlington Forcing. L.

Flat to ovoid, white very quick grower, superior for growing under glass or growing in the open garden.

No. 29. Dreer's crystal Forcing. D.

Desirable and shapely radish. Superior to any other white forcing radish. Quick growth and mild flavor. Tops remarkable small enough to allow of easy tying in bunches. Can be grown satisfactorly in open ground making it a desirable variety for home garden as well as a desirable sort for market gardeners to grow. Compared with White Box Round, White forcing etc. it is far superior in every way.

No. 30. New Leafless. B.

A new variety of most distinct growth, the leaves being very small, heavy, rough and crumpled. Roots bright scarlet and small, one half to three fourths inch in diameter. Not quite as early as scarlet button (No. 3.), but on account of small top can be grown more

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closely together.

No. 31: Red Rocket. H.

Long eval bright red good flavor. Small top which permits close planting. Flesh crisp and of good flavor.

No. 32. Deep scarlet Olive sdaped. L. A showy half long variety.

No. 33. Olive shaped scarlet. H.

Very useful. Bright color, flesh is crisp and tender. A great favorite. Grows quickly.

No. 34. Early scarlet Olive shaped. F.

In form of an olive terminating in a very slim tap root. Stem scarlet, neck small, flesh rose colored tender and excellent. Early and well adapted for forcor general crop.

No. 35 ( Olive shaped short leaved. F.

Differs from No. 34 in being deeper in color, terminating more abruptly at tip, maturing a little earlier and having fewer and shorter leaves. Good for forcing.

No. 36. Early carmine olive shaped. B.

Deep rich red oval crisp flesh. Medium top and a good variety.

No. 37. Scarlet olive shape. B.

No. 38. Early oval dark red. B.

Oval dark red. Root tapers to a long tap root. Good variety.

No. 39. Cardinal Globe. D.

Globular in shape, brilliant cardinal red color.

It is a quick forcer and quality is fine, crisp and tender. By far the best for forcing and does best in open ground.

No. 40. Early scarlet globe. F.

The variety makes roots fit to pull as early as No. 5: but are much larger when full size. Roots round or slightly olive shaped. Color rich deep scarlet, flesh white anh tender.

No. 47: White tipped rocket. H.
Brilliant scarlet with white tips, flavor delic-

androne de la companya del companya de la companya del companya de la companya de

en de la companya de la co ious. Superior to French Breakfast because it is earlier.

No. 42. French ca L.

Skin brilliant scarlet, flesh white and crisp.

Very choice. Matures quickly, two inches long.

No. 43. New bright breakfast. B.

Similar to French breakfast, but is of even quicker growth while the carmine color is replaced by brightest scarlet which contrasts finely with the thite tip.

No. 44. French breakfast. F.

A medium sized radish, clive shaped, small tops, of quick growth, very crisp and tender of a beautiful scarlet color except near the tip which is pure white. A splendid variety for the table on account of its excellent quality and its beautiful color.

No. 45: Early white clive shape. F.

Like No. 34; scarlet olive shaped except that roots are clear white and a little longer.

No. 47: Half long deep scarlet. B.

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Very popular in New Orleans market radishes.

Large and most brilliant scarlet coloring. Flesh
purest white erisp and juicy.

No. 48. Half long deep scarlet. F.

A good half long red and crisp tender flesh.

No. 49. Half long deep scarlet. L.

A variety half the length of long scarlet and of same form. Matures early.

No. 50. Wonderful half long. L.

Red, rapid in growth. About three inches long contracting from a broad shoulder to a sharp point, very symetrical and uniform in shape. Color a bright scarlet.

No. 53: Landreth's white lady finger.

Early maturity. A large white crisp variety about half as long as Long scarlet and similar in shape. A very desirable sort.

No. 52: White delicacy. D.

An improvement on the white Strassburg, being earlier more evenly shaped and smaller tap, grows into

full size and perfect shape during the hot weather for out door early fall sowing it is sure to make a crop of uniform white radishes which are in quality first class. A profitable market gardeners sort.

No. 53. Woods early F.

This is not only a good variety for forcing, being shorter and thicker than the old long scarlet
short tap, but is one of the very best for first crop
out of doors.

No. 54: Long cardinal. B.

This is similar in growth and season to the

Of equally large size fine quality, but the rosy carmine coloring is replaced by a bright deep scarlet. Crisp tender radish grows quickly.

No. 55 : Early long scarlet tip improved. F.

The small topped sort is about six inches long, grows half out of the ground and is a standard and excellent sort either for private garden or market use. Roots very uniform in size, smooth and very bright red in color. Flesh white and crisp.

No. 56. Market gardeners early long scarlet. L.

Longer than scarlet olive and shorter than old
long scarlet. An admirable long variety for forcing.

No. 57. Cincinnati market. B.
A'slow growing long. Good radish. Fair flesh.

No. 58. Cincinnati market. D.

A new extra early variety of the long scarlet type of a clear bright red color.

No. 59. Long brightest scarlet white tipped. L.

A half long with white point. Very early, color
a bright scarlet almost unexampled in beauty.

No. 60. Long brightest scarlet white tipped. F. See No. 59.

This is the brightest handsomest colored scarlet radish known and a decided improvement in earliness and color over other varieties of this class. Early maturing.

No. 61: Improved

Although this American variety is too strong a

grower to be used for forcing it is one of the very best for sowing out of doors. Root s are usually very early, remaining hard and crisp until they reach a diameter of an inch orm more and so furnish good roots for a much longer time than many. Roots scarlet rose above shading into white at the tip. Long cylindrical for the upper two thirds and then gradually taper to the tip. Flesh white mild and crisp.

No. 62. White Cartier. D.

Beautiful long white radish. Good summer radish matures in six or seven weeks and is of mild flavor, tips are small. Desirable for market gardeners to grow.

No. 63. Long white F.

Long slender smooth white root. Crisp and tender flesh. Good summer sort.

No. 64! New white icicle. B.

No good in this experiment. Small and a slow grower.

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## Variation in shape.

No.	No.	
1. Failure.	<b>55</b> '	100% true.
2. 100% True.	23.	6% varied, rand to
3. 100% True.		olive shape.
4. 100% True.	24:	100% true.
5 ( 100% True.	2 <b>5</b> (	100% true.
6. 100% True.	26.	60% true.
7: Failure.	27:	12% true.
8. 100% True.	29.	12% varied.
9. Failure.	29.	3% varied.
10. 100% True.	30.	18% varied, ran to
11. 100% True.		turnip shape.
12. 9% varied.	31:	6% varied.
13. 100% True.	<b>3</b> 2•	15% varied.
14: 9% varied.	33,	15% varied.
15: 9% varied.	34.	100% true.
16. 15% varied, ran to	35 (	9% varied.
olive shape.	36.	9% varied.
17: 3% varied.	37.	19% varied, ran to round.
18. 9% varied	38.	100% true.
19. 9% varied.	39.	15% varied.
20.3% varied.	40.	15% varied.
21: 100% true.	41:	100% true.

No.		No.	
42.	15% varied.	54.	100% true.
43.	6% varied.	55 4	18% varied
441	18% varied.	561	100% true.
45 (	30% varied.	57:	100% true.
46.	9% varied.	58:	17% varied
47.	6% varied.	59.	100% true.
48.	12% varied.	60.	100% true.
49.	6% varied.	61:	100% true.
50.	100% true.	62:	100% true.
51.	4% varied.	63.	100% true.
52.	24% varied.	64.	100% true.
53.	12% varied.		

Radishes (14-29 inclusive are turnips.

(30--48 " " olives. (47-52: " half-long. (53--84 " " long.

#### Varieties.

- Red. (1: Landreth's earliest.
  - (2. Rapid forcing from Henderson.
  - (3. Burpes's earliest scarlet button.
  - (4. Rapid forcing from Henderson.
  - (5: Early deep scarlet turnip forcing from Ferry.

- Gold brown. (24: Golden Dreedon from Burpee.
  - White. (25( Early white turnip rooted from Ferry.
    - (26. Large white globe from Burpes.
    - (27. Philadelphia white box from Burpee.
    - (28. Burlington forcing from Landreth.
    - (29. Dreers crystal forcing from Dreer.
  - Red. 30. New leafless from Burpee.
    - (31: Red Rocket radish from Henderson.
    - (32. Deep scarlet olive shaped from Landreth.
    - (33. Olive shaped scarlet from Henderson.
    - (34! Early scarlet olive shaped from Ferry.
    - (35: Olive shaped short leaved from Ferry.
    - (36. Earliest carmine olive shaped from Burpee.
    - (37: Scarlet olive shaped from Burpee.
    - (38. Early oval deep red from Burpee.
    - (39. Cardinal globe from Dreer.
    - (40. Early scarlet globe from Ferry.

## White tipped.

- (41: White tipped rocket from Henderson.
- (42: French cap' from Landreth.
- (43. New bright breakfast from Burpee.
- (44. French breakfast from Ferry.

- Red (6. Extra early scarlet, turnip from Burpee.
  - continued.(7: Earliest scarlet erfurt turnip from Landreth.
    - (8. Early scarlet, turnip rooted from Ferry.
    - (9. Early deep scarlet turnip frmo Landreth.
    - (10. Early round deep scarlet from Ferry.
    - (11. Early round dark red from Burpee.
    - (12. Dark red ball from Burpee.
    - (13. Early scarlet Prussian Globe from Landreth.
    - (14. New triumph from Burpee.
    - (15) Triumph from Henderson.
    - 16. Triumph scarlet striped forcing form Ferry.
    - Garnet (17: Early garnet turnip rooted from Landreth.
- White (18. Extra early (ruby pearl) from Burpee.
- tipped. (19. Extra early white tipped forcing from Landreth.
  - (20. White tipped scarlet ball from Burpee.
- White tipped(21, White tipped scarlet gem from Dreer.
  - (22. Early scarlet turnip white tipped forcing from Ferry.
  - (23. Scarlet turnip white tip from Burpee.

- White. (45. Early white olive shaped from Henderson.
  - (46. New forcing earliest white from Burpee.
- Red. (47. Half long deep scarlet from Burpee.
  - (48. Half long deep scarlet from Ferry.
  - (49. Half long deep scarlet from Landreth.
  - (50. Wonderful half long from Landreth.
- White. (51. Landreth's white lady finger.
  - (52. White delicacy from Dreer.
  - Red (53. Wood's early frame from Ferry.
    - (54! Long cardinal from Burpee.
    - (55. Early long scarlet short top improved from Ferry.
    - (56. Market gardener's early long scarlet from Landreth.
    - (57. Cincinnati market from Burpee.
    - (58. Cincinnati market from Rreer.
- White (59. Long brightest scarlet white tipped from tipped.

  Landreth.
  - (6Q. Long brightest scarlet white tipped from Ferry.
- White. (61: Improved chartier or shepard from Ferry.

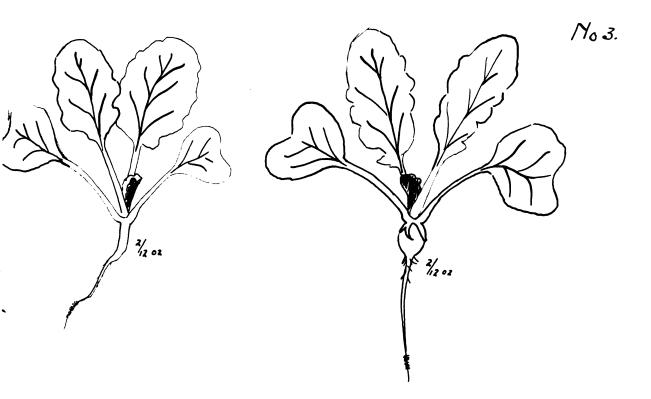
White (62. White chartier from Dreer.

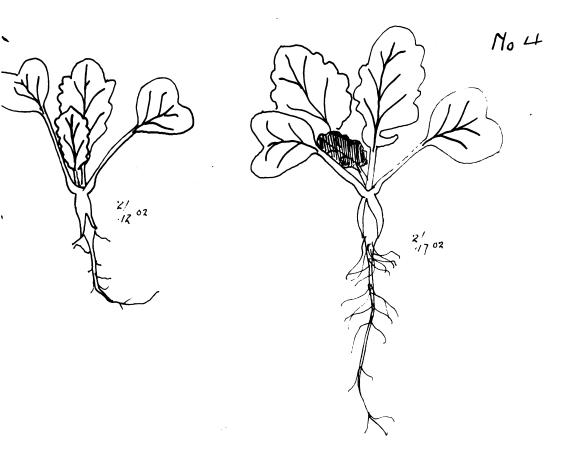
Tipped.

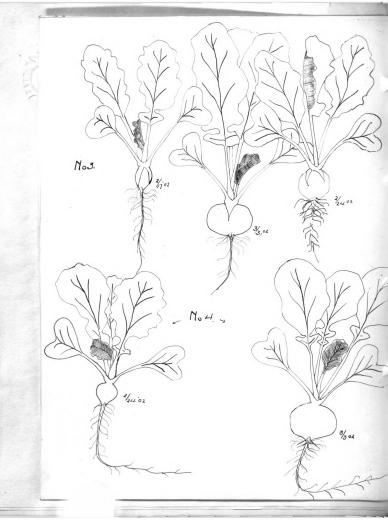
White. (63. Long white vienna from Ferry.

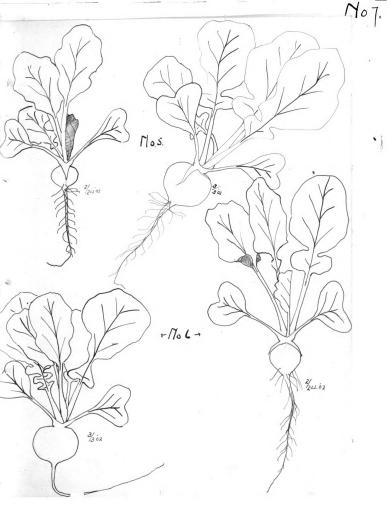
(64! New white icicle from Burpee.

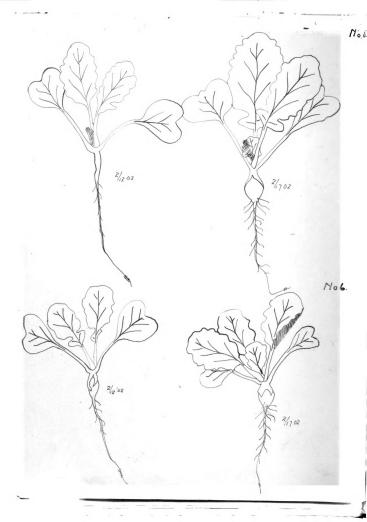
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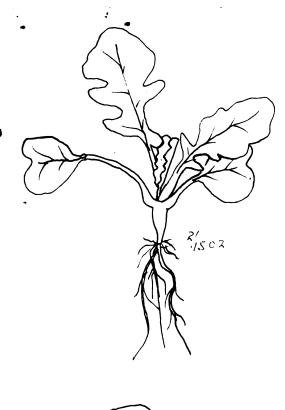




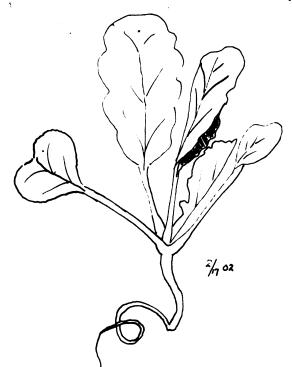






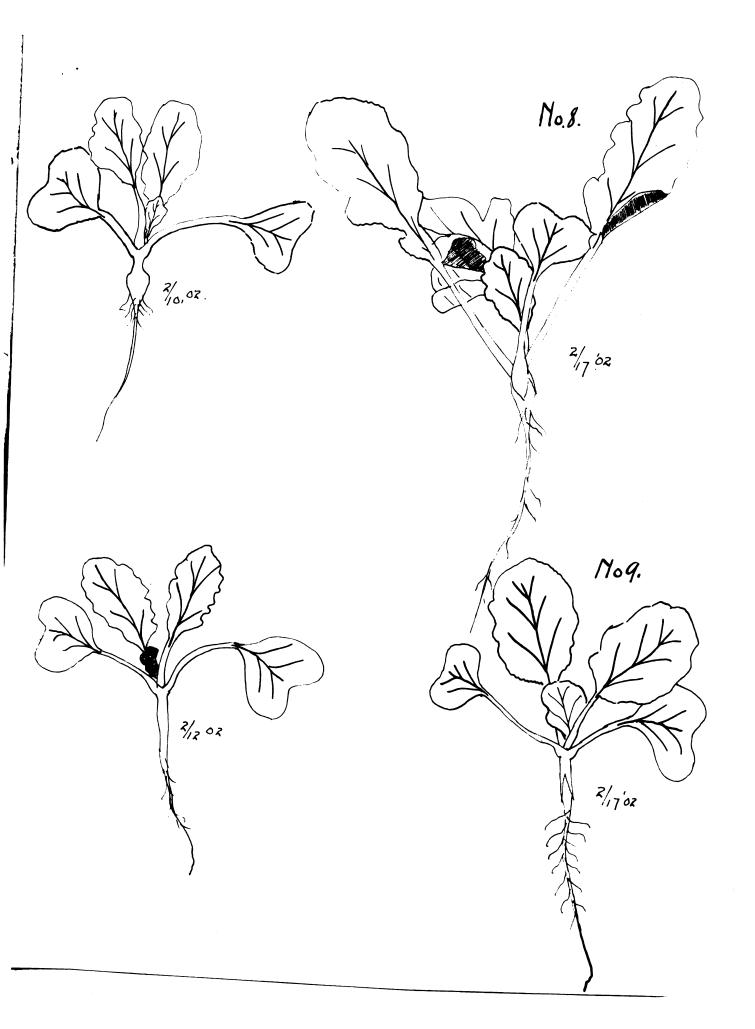




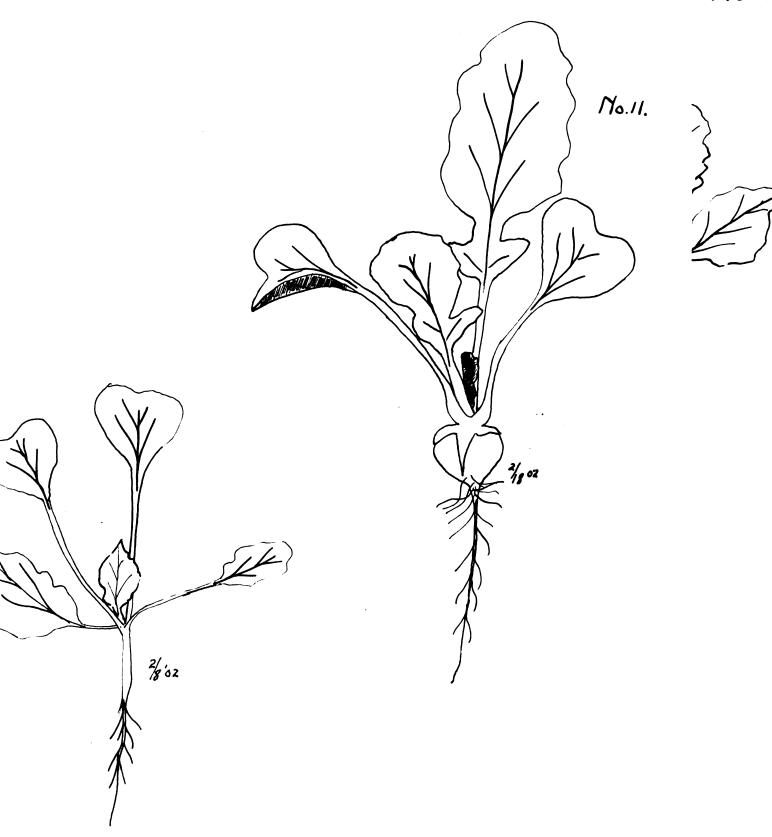


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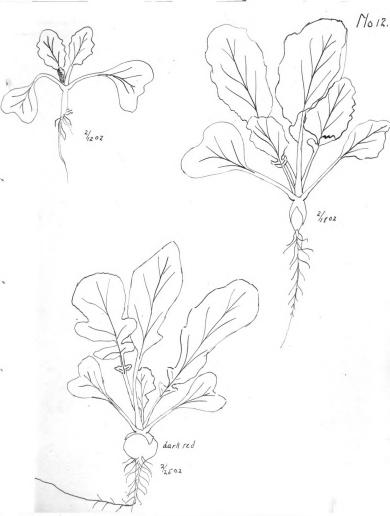
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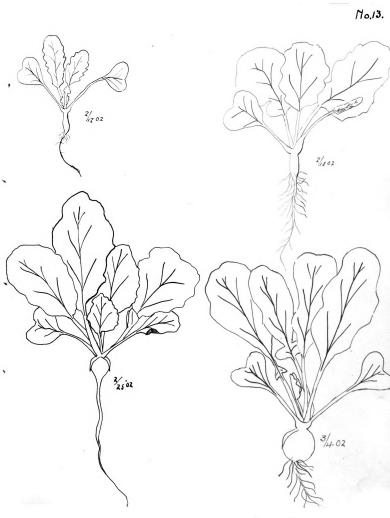






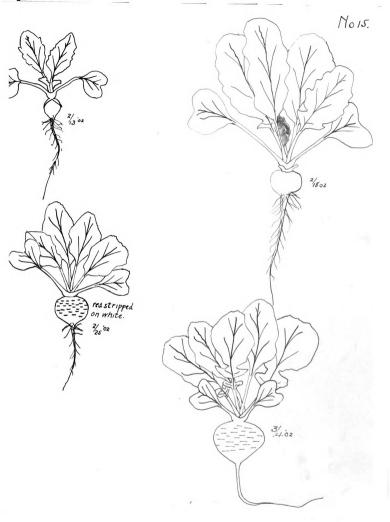




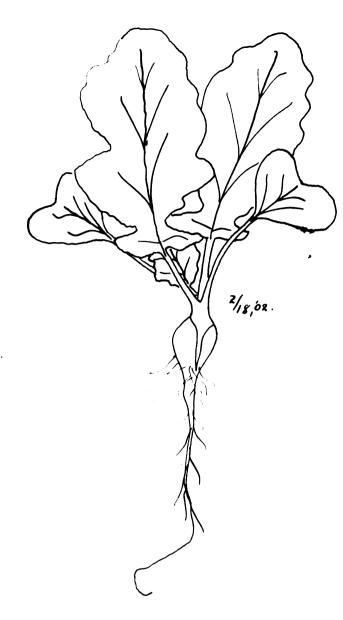


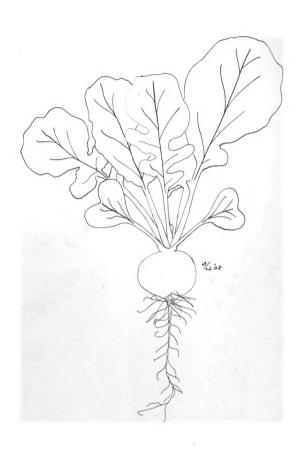


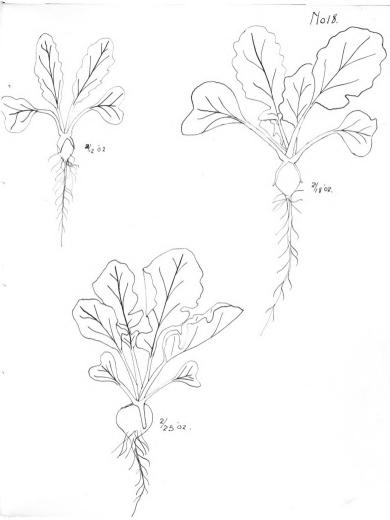
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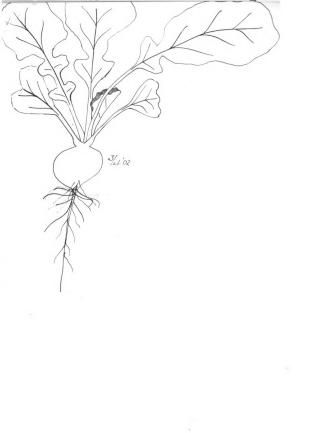


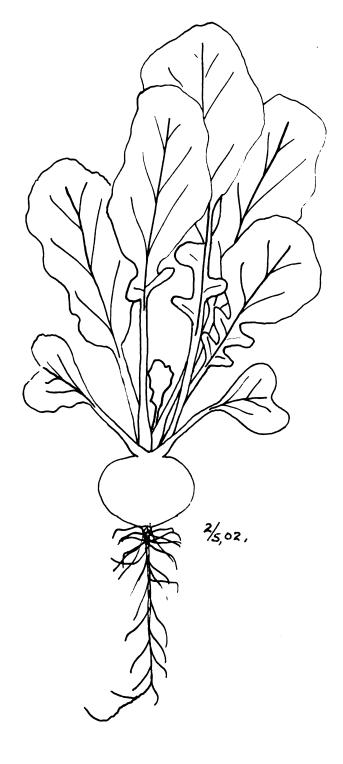




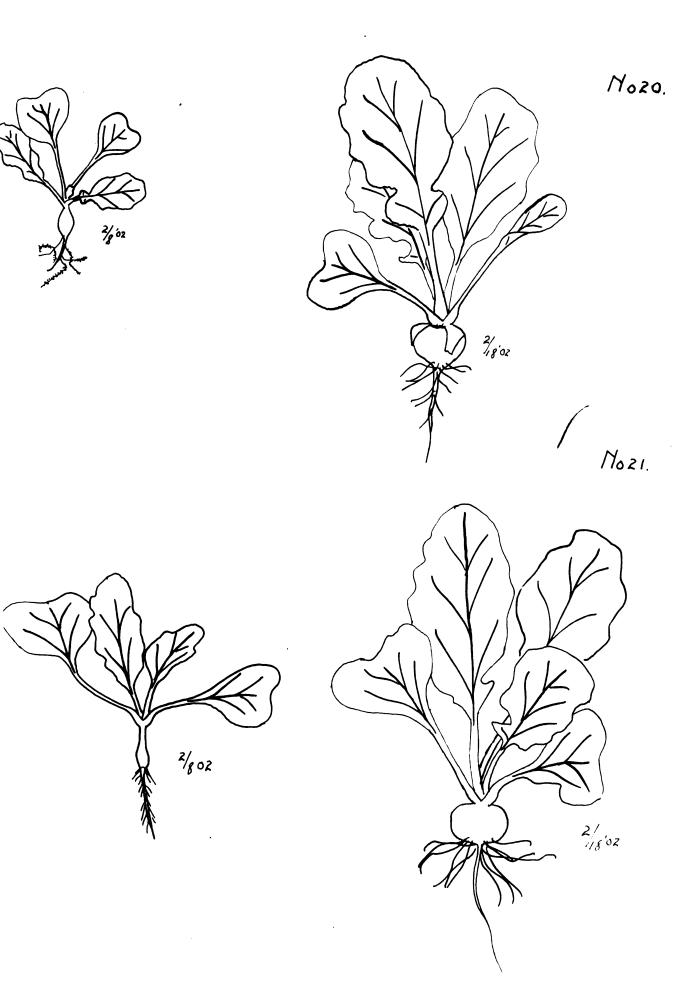


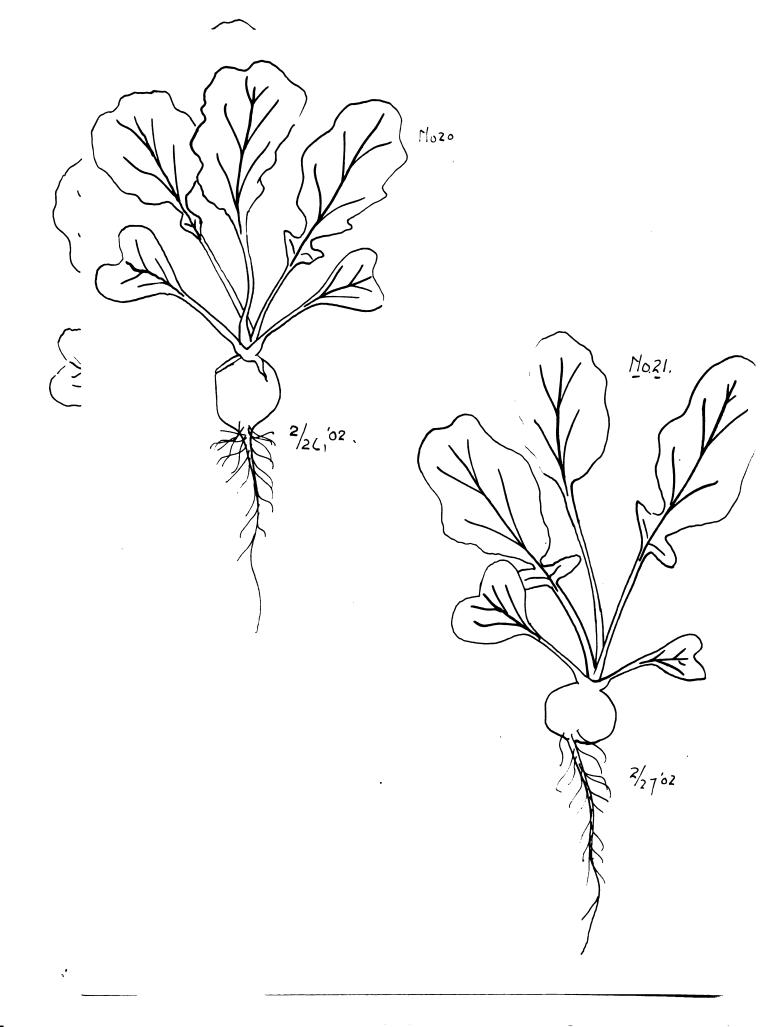


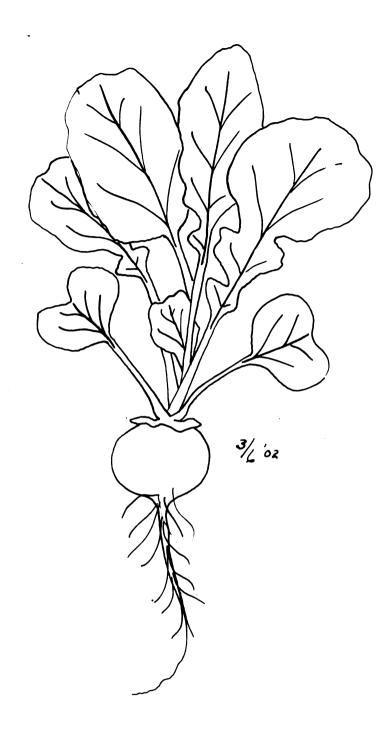


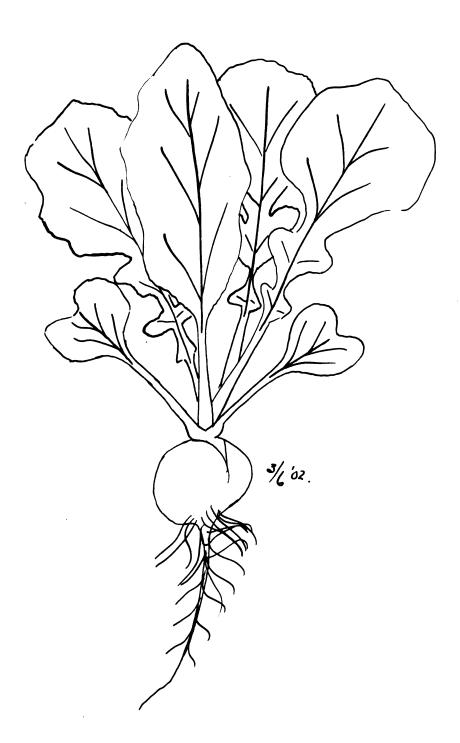


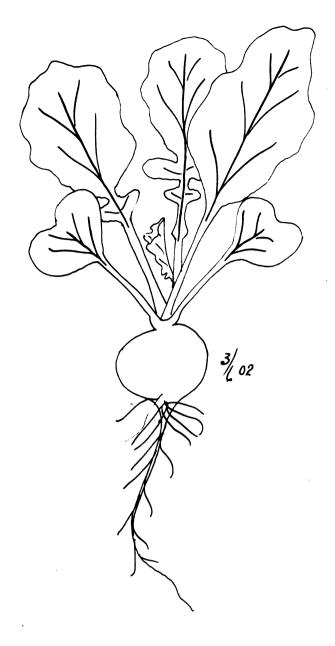
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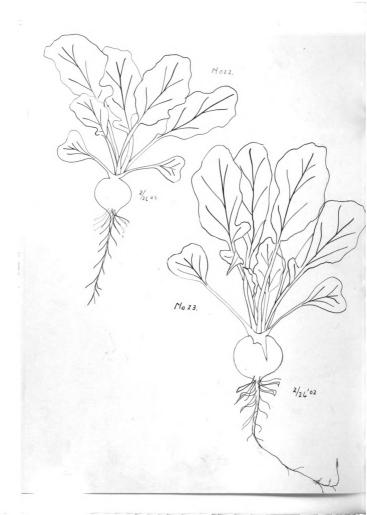


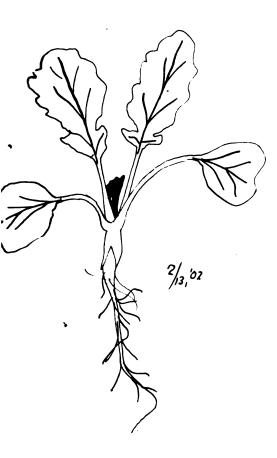






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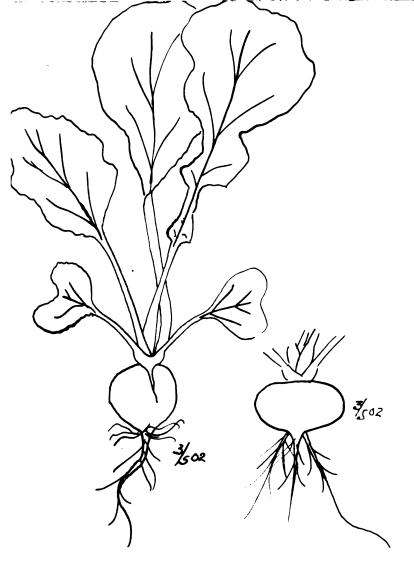


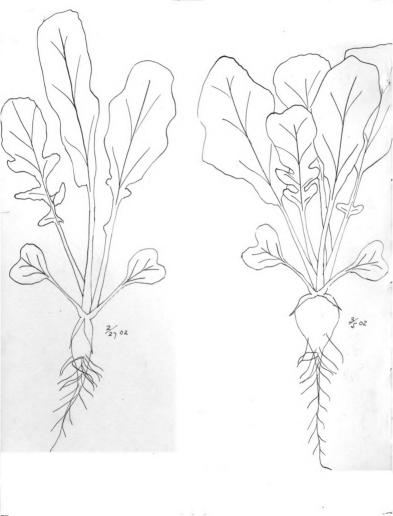






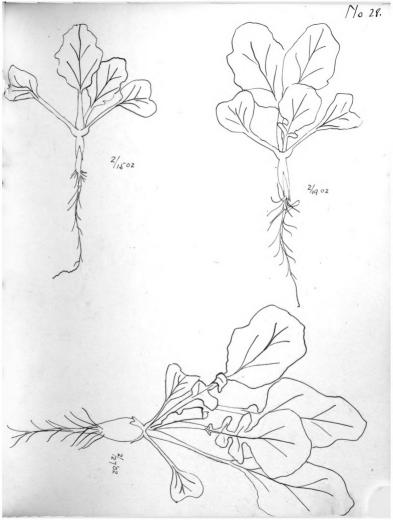




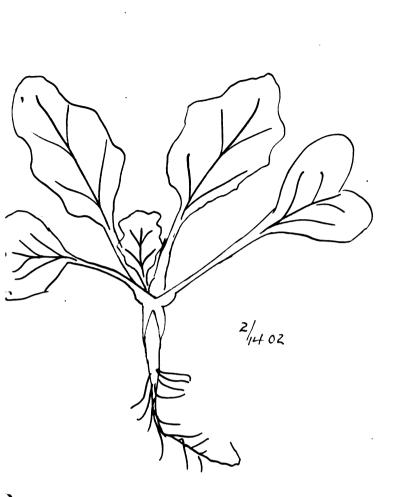




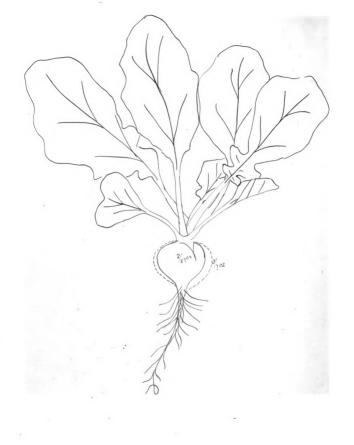




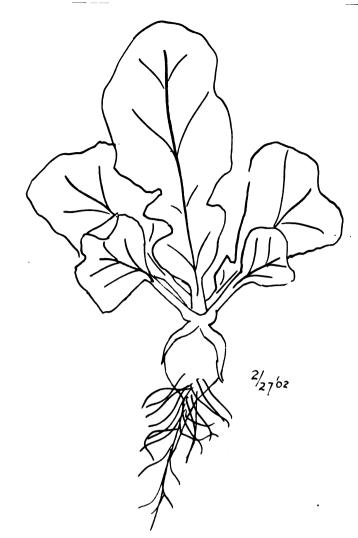


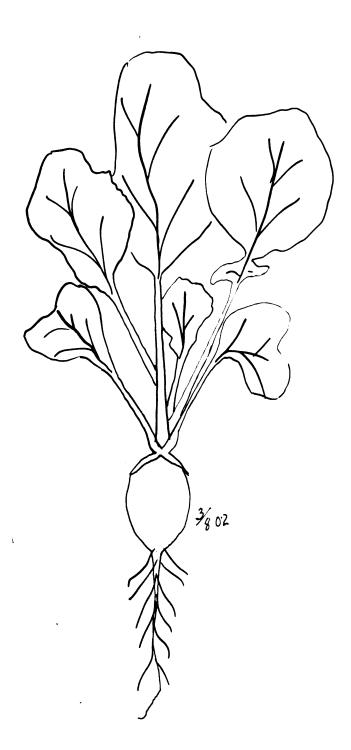


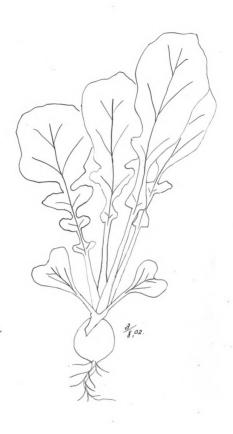


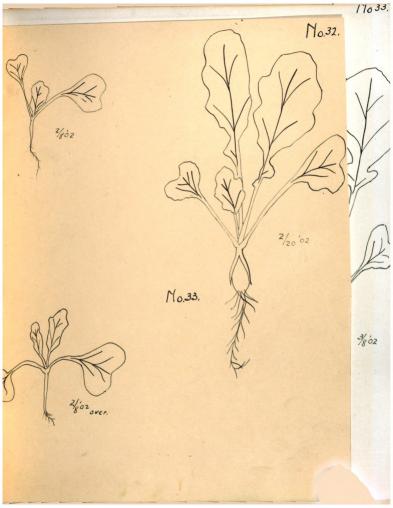


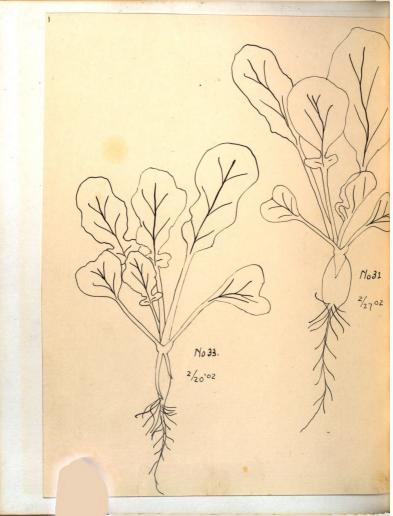




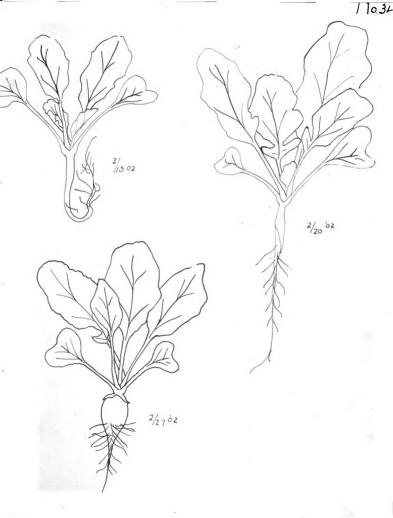






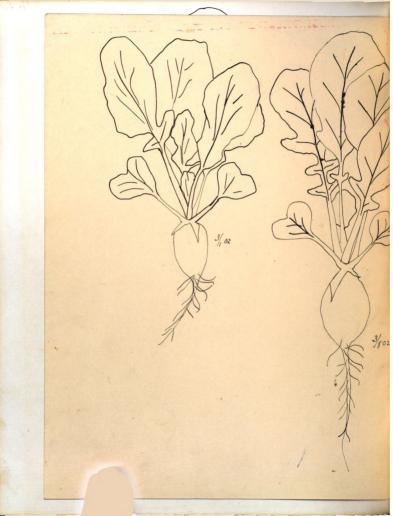


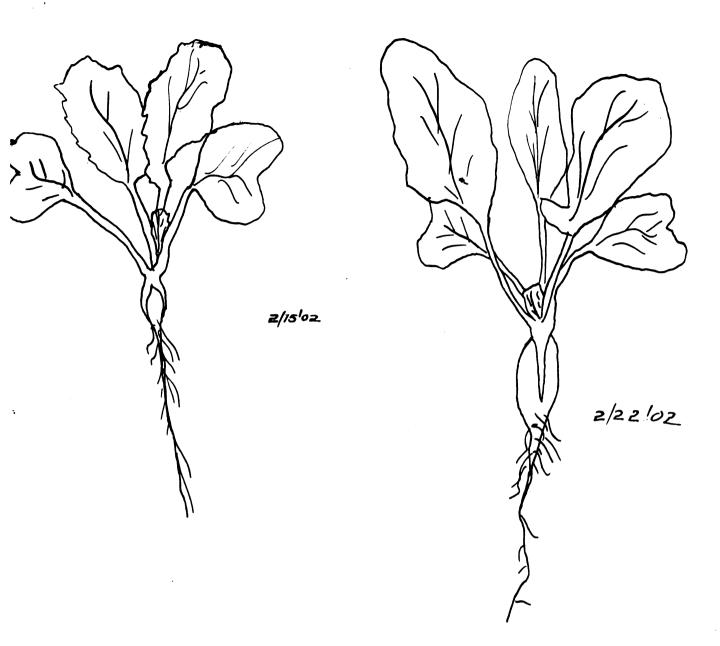


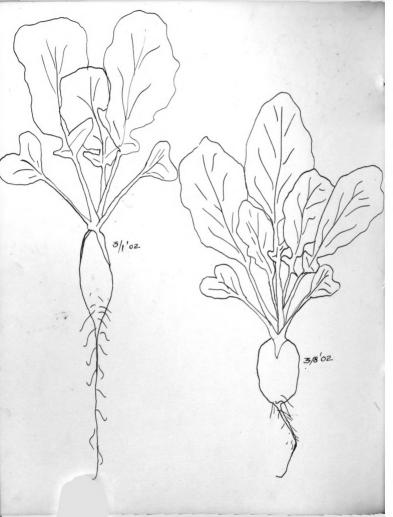


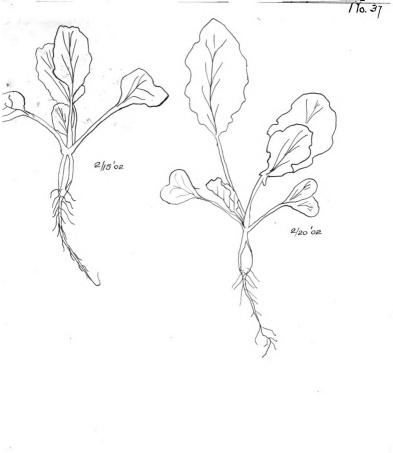


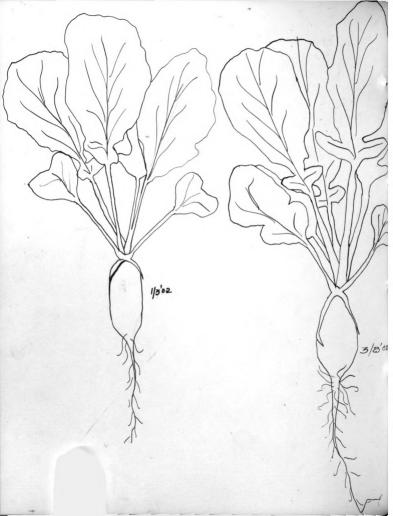


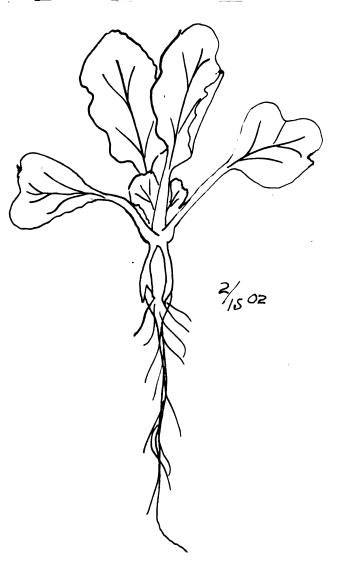


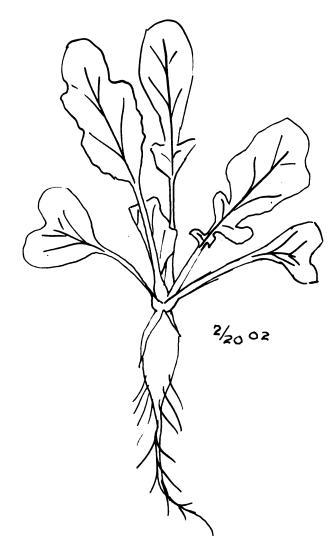


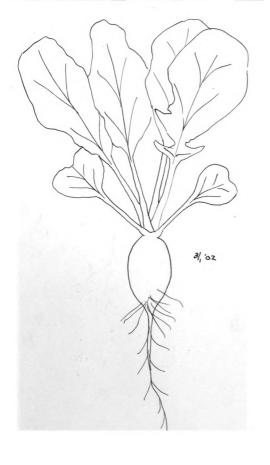


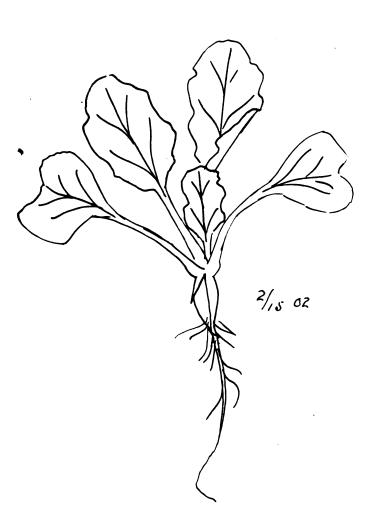








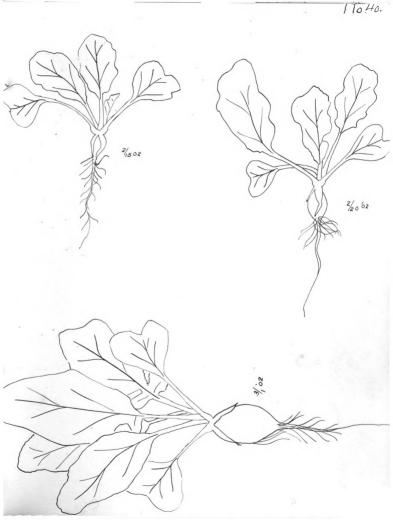


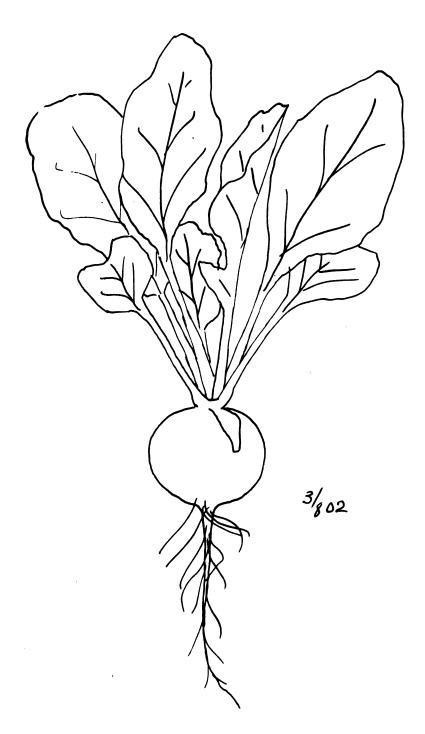




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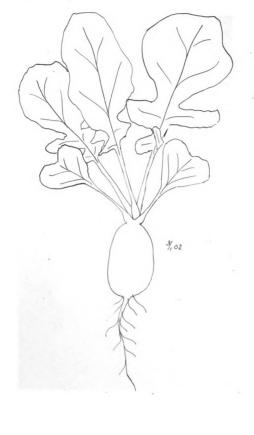


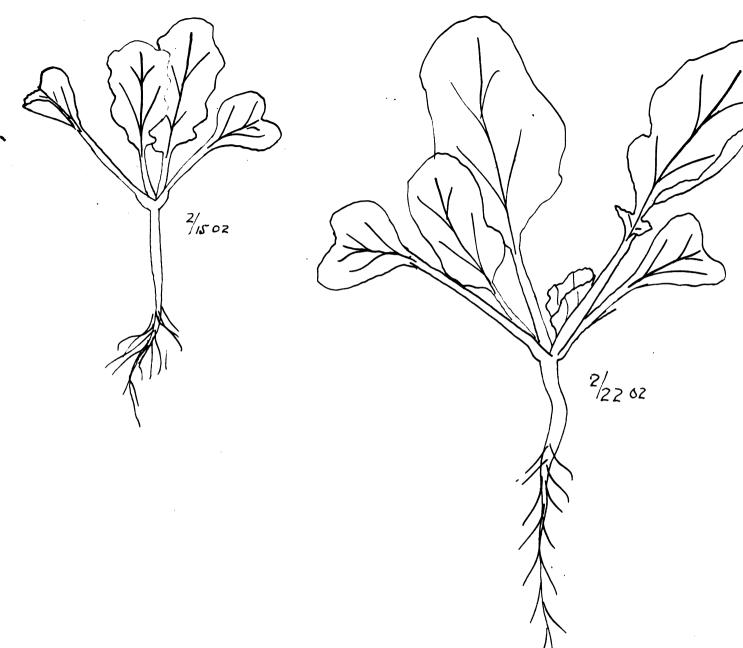


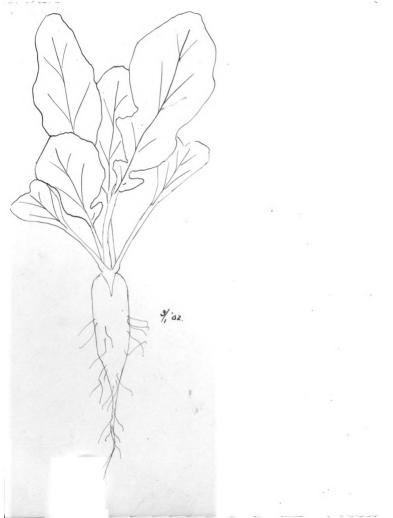






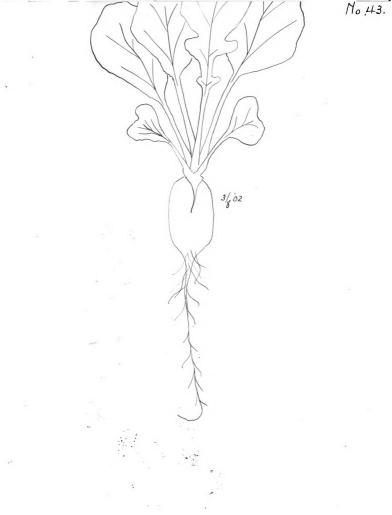


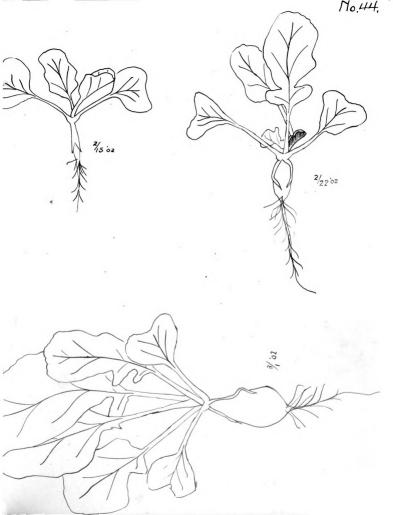


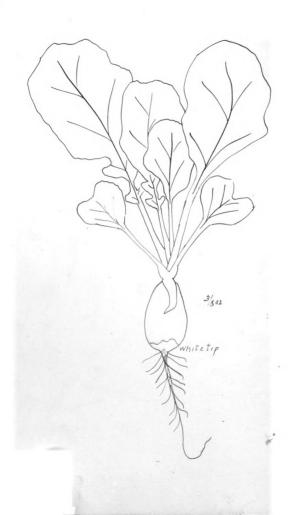


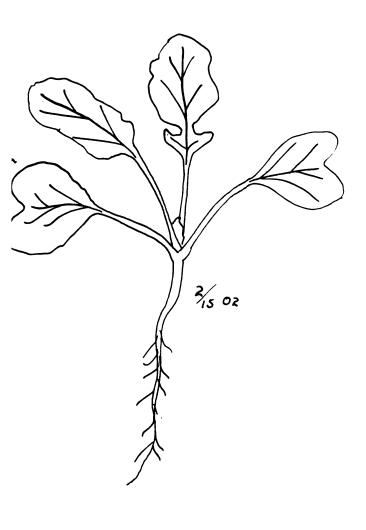




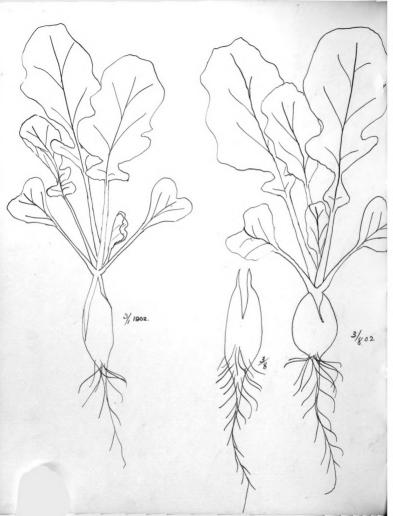


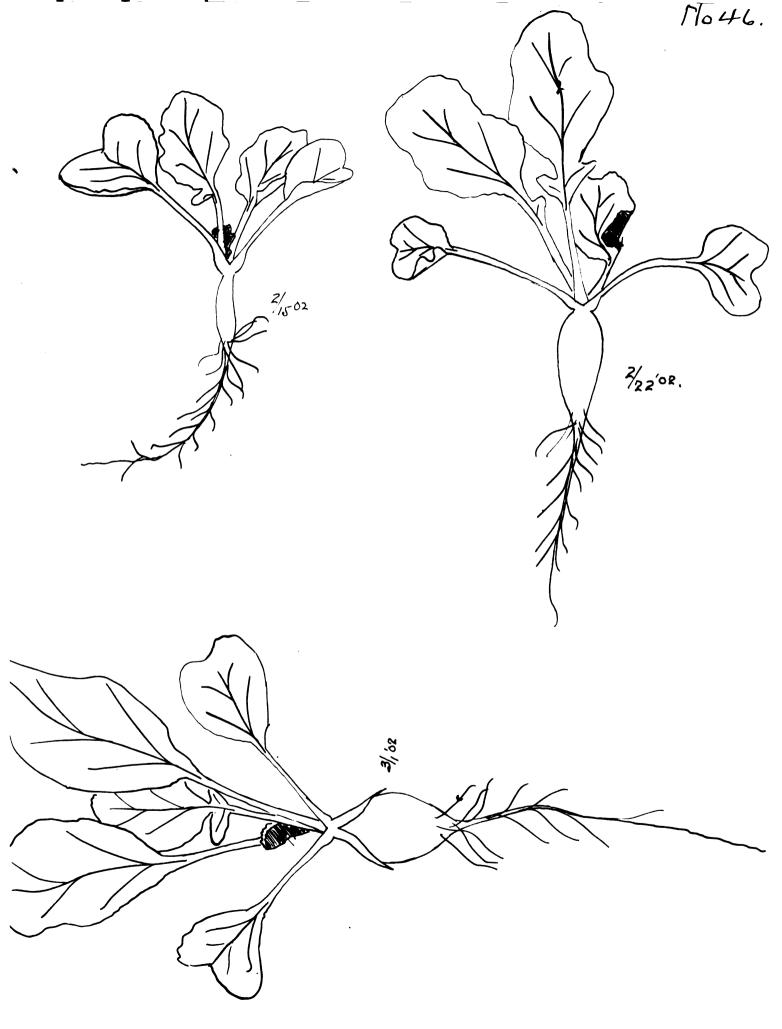


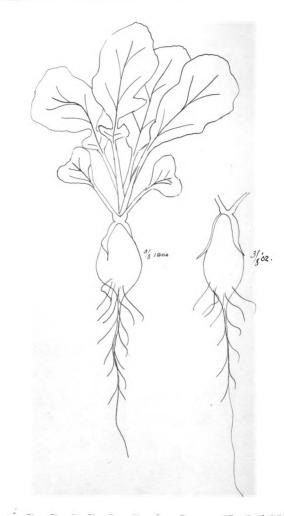


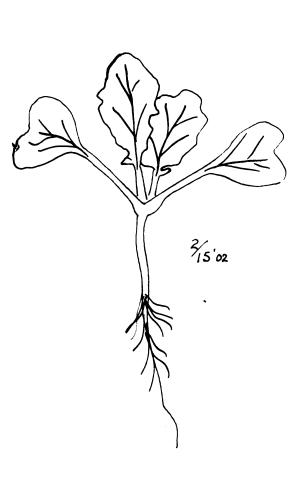


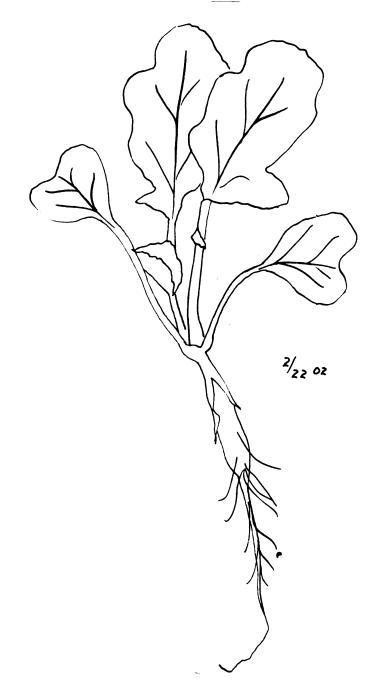




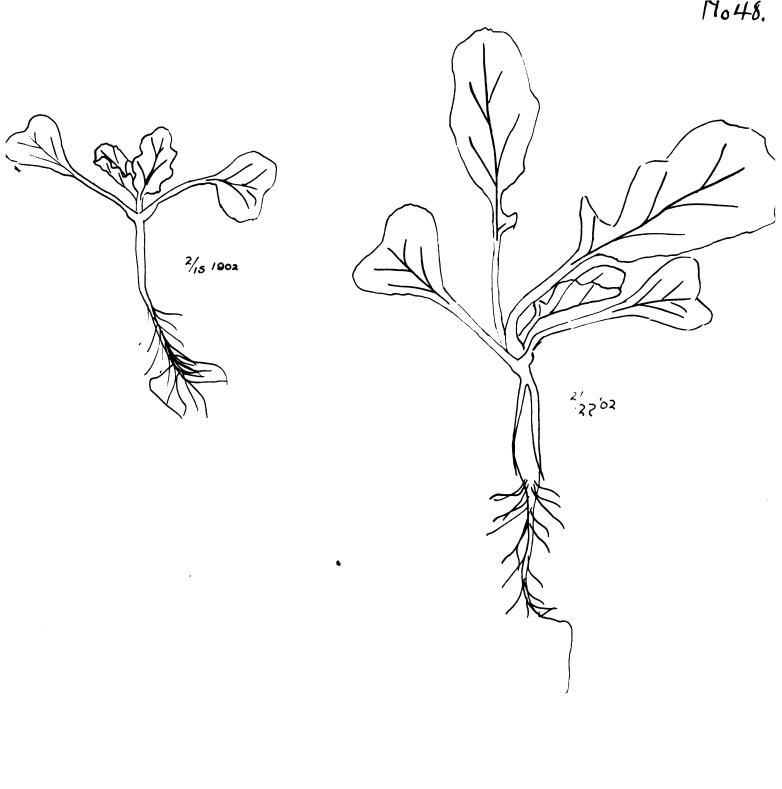


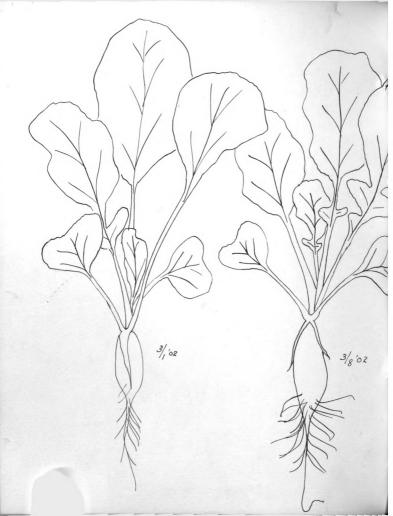


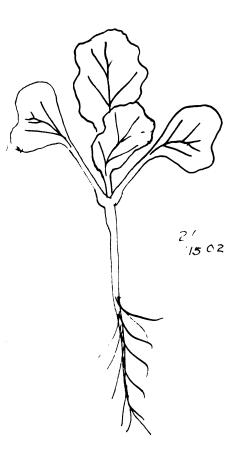






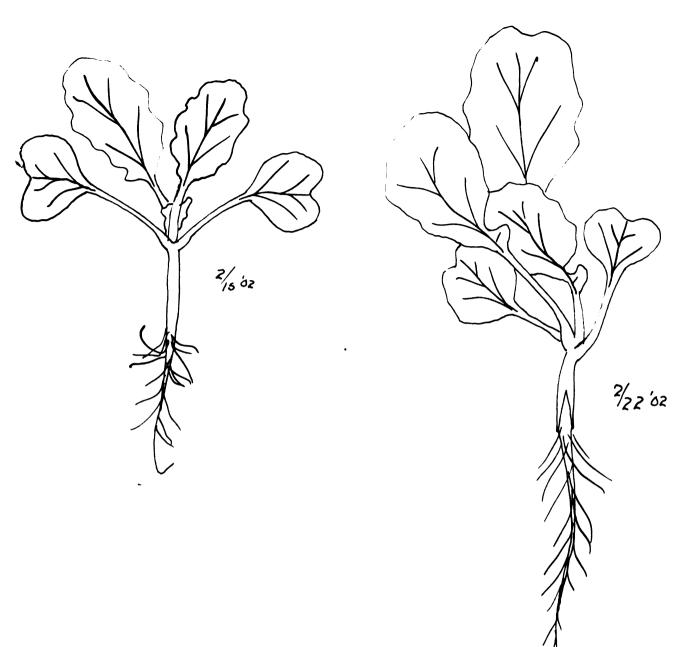


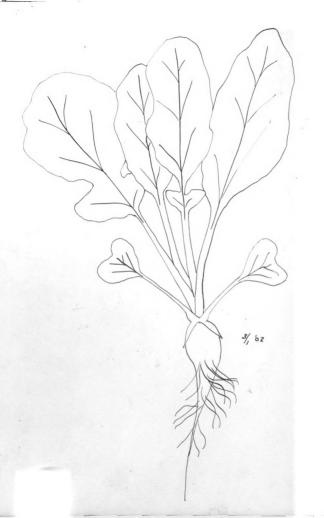








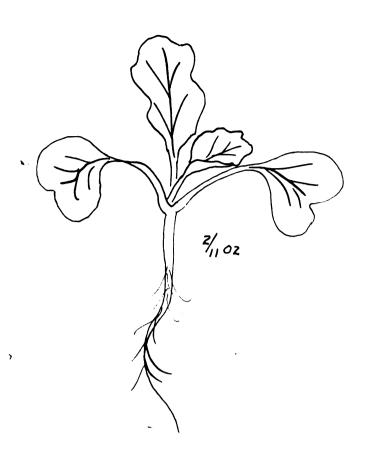


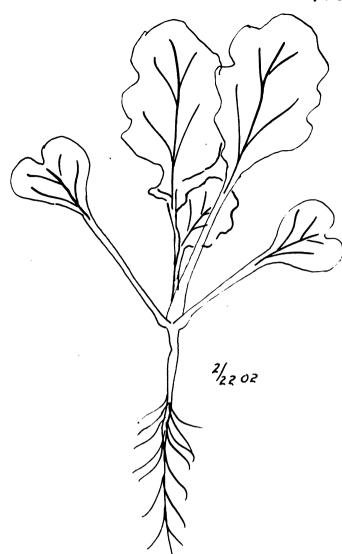


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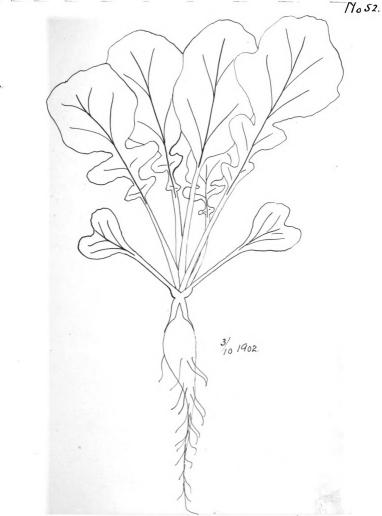


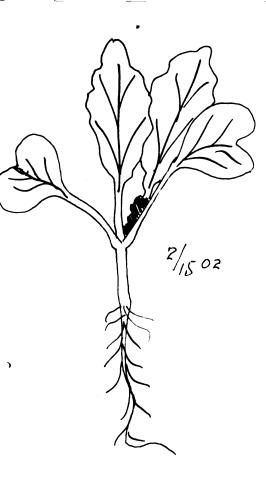


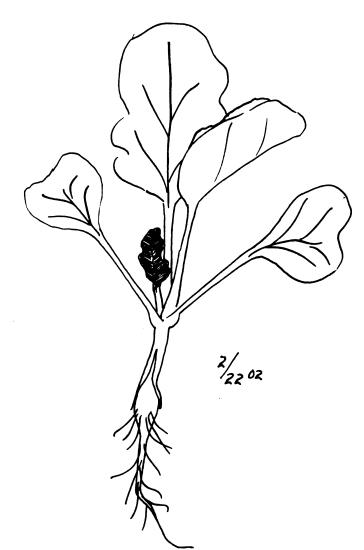


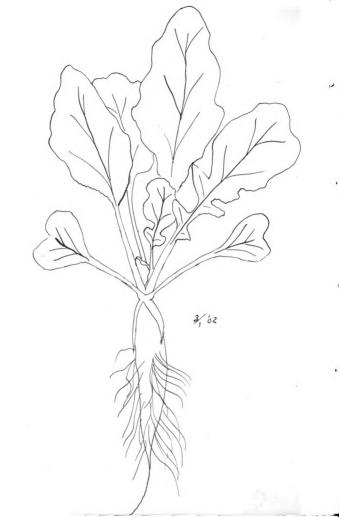




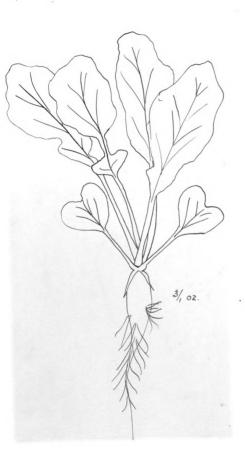




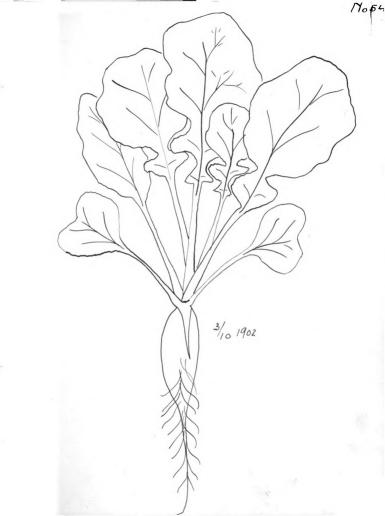


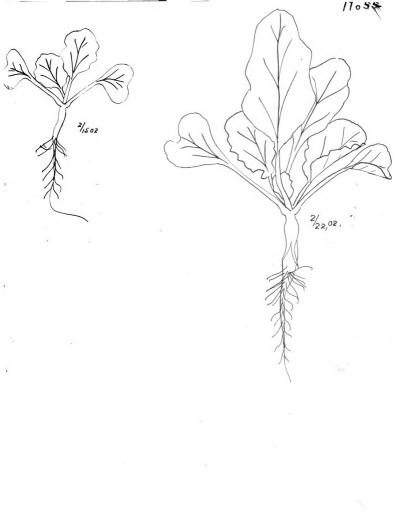


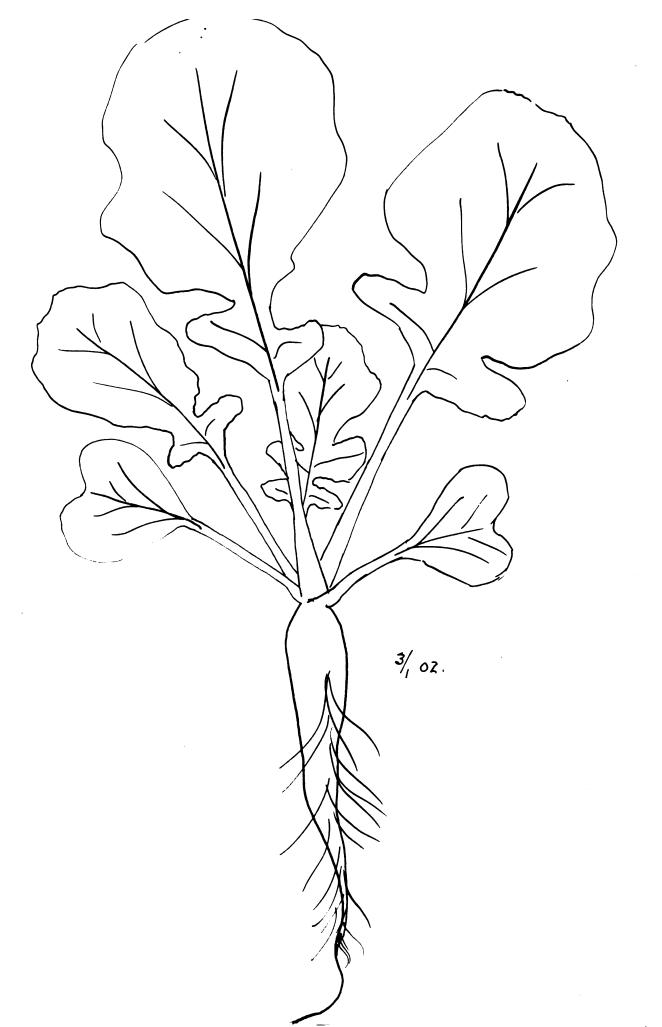




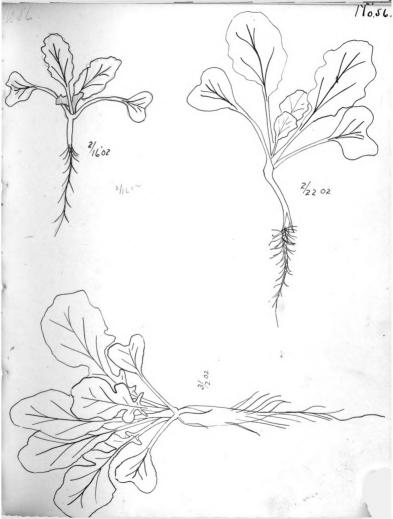
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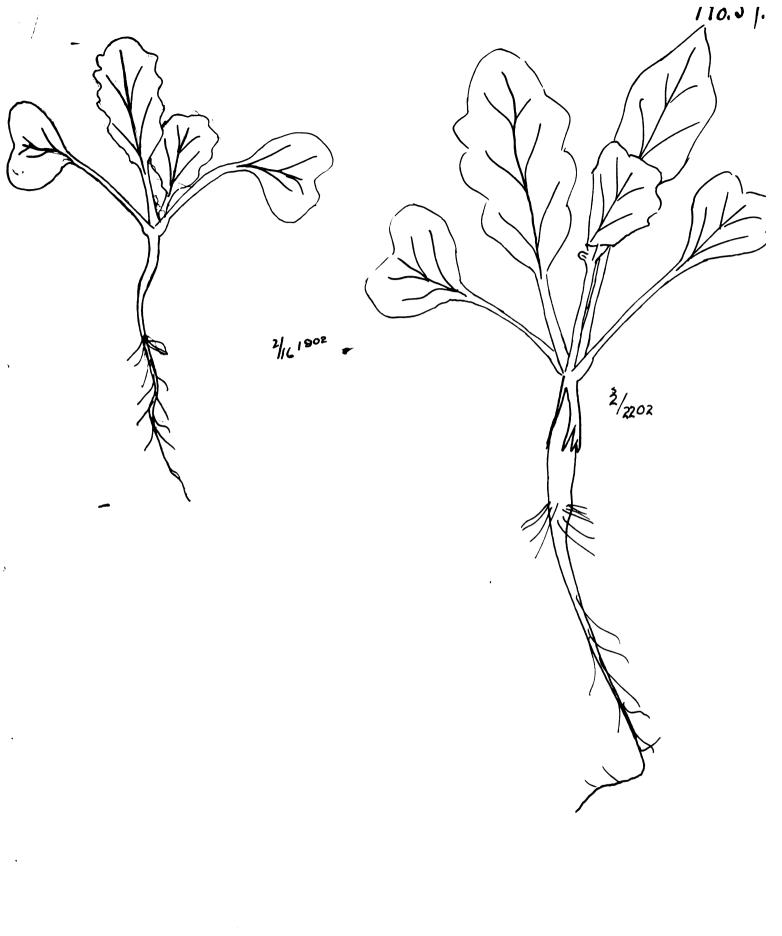


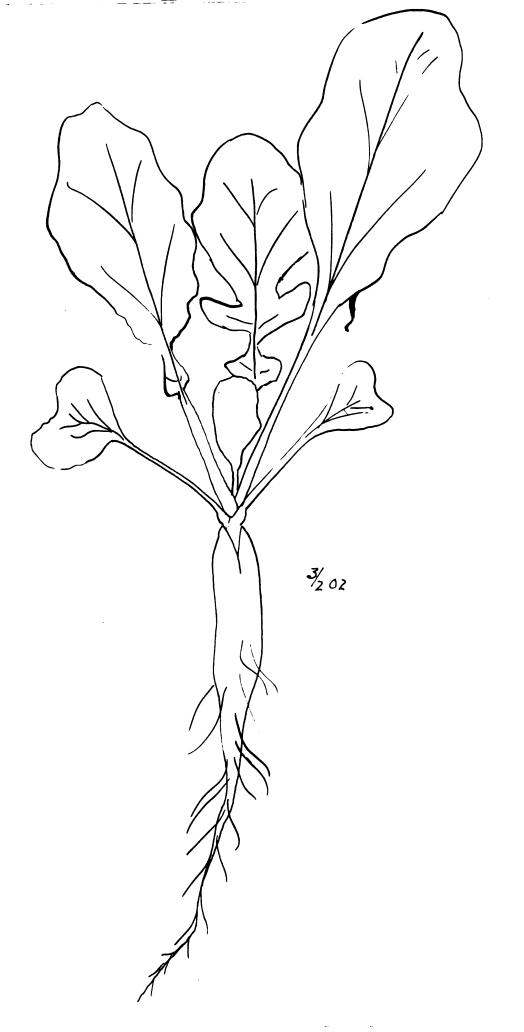


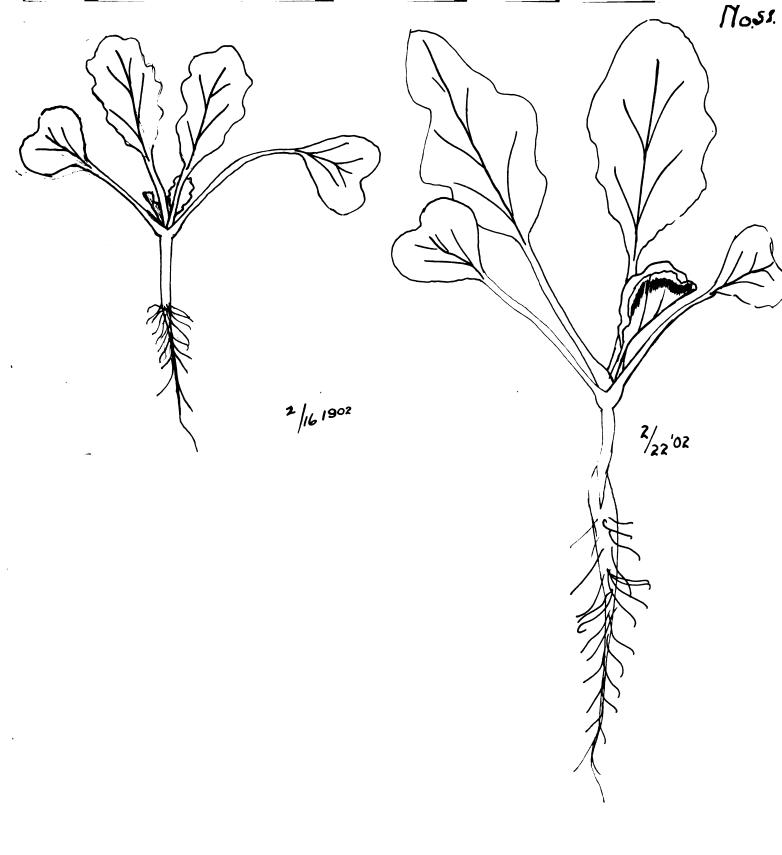
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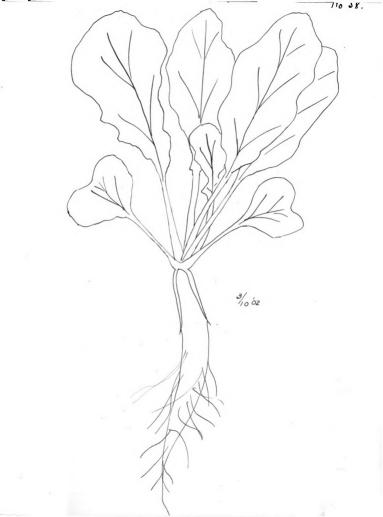


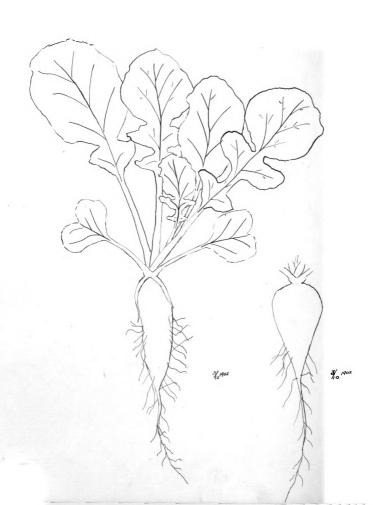




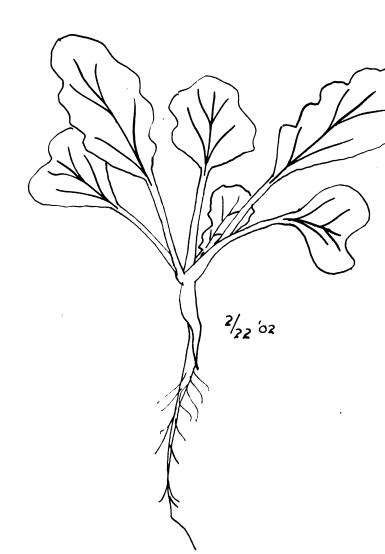




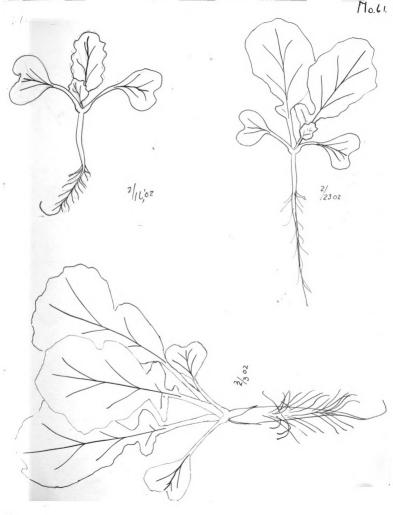


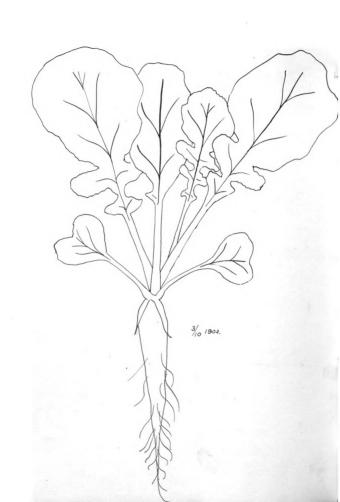




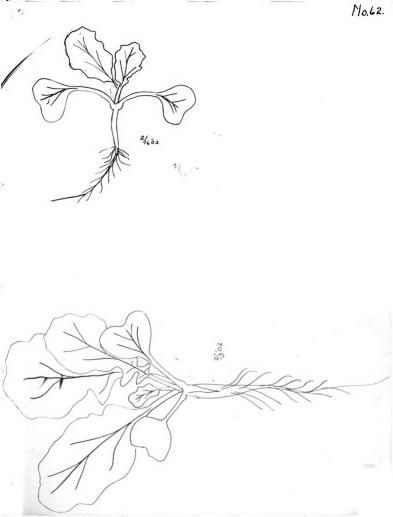




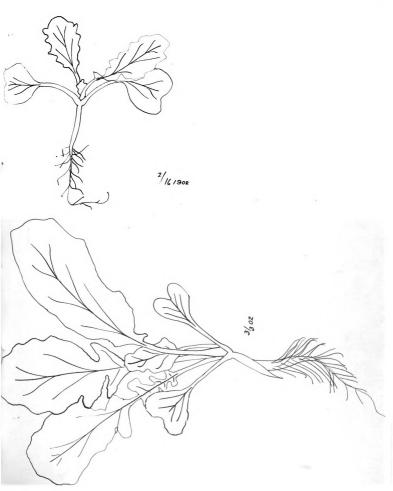




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