

Proefstation
voor de Groenten- en Fruitteelt
onder glas
te Naaldwijk

★

BIBLIOTHEEK
der
LANDBOU Hogeschool
WAGENINGEN

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J22A57-

International working group on soilless culture.

(Iwosc)

BIBLIOGRAPHY OF THE LITERATURE ON

SOILLESS CULTURE

(Second edition.)

Compiled by the Department
on Soilless Culture of the
National Council for Agri-
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The Netherlands.

Bibliothek
of
Landbouw Hogeschool
WAGENINGEN



FOREWORD.

Many bibliographies are published in which the soilless culture has been included. For research-purposes on soilless culture it has been felt necessary to have an as complete as possible documentary-file solely about this subject.

This bibliography supersedes the first part of May 1957. Now it has over 2700 titles.

The authors are put in alphabetical order in such a way that a new letter starts on a new page. A subject-index is also added.

We wish to express our thanks and appreciation to all members for their co-operation on sending us copies of their publications regarding soilless culture.

Naaldwijk, September 1958.

The Secretary of the Iwosc,

A.A. Steiner.

*Bitte für
Brew NW 1*

ERRATUM.

H. 44 was inadvertently left out. This should read:

- | | |
|-------------------|--|
| 44. Hamner, K.C., | Effect of mineral nutrition on Ascorbic- |
| Lyon, C.B., | acid content of the tomato. |
| Hamner, C.L. | Bot. Gaz. <u>103</u> , 586-616. |
| 1942. | |

After number B. 13 follows B. 36 to B. 49 inclusive. The missing numbers B. 14 to B. 35 inclusive are printed on the next two pages.

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VAN
LANDBOUW-SCHOOL
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T.N.O.

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Phascolus vulgaris (bean).

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A. 101;

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Lilium (lily).

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- A. 114, 120, 121, 124, 126, 128, 131, 134, 137, 138, 140, 143, 147,
- A. 150, 155, 162, 163, 170, 171, 177, 179, 182, 190, 206, 214;
- B. 10, 12, 13, 26, 42, 44, 58, 69, 72, 97, 100, 200, 206, 207;
- C. 12, 44, 46, 52, 53, 54, 55, 71, 97, 103, 105, 115;
- D. 6, 7, 13, 14, 19, 20, 36, 40, 51, 55, 67, 68, 83, 84, 89;
- E. 2, 3, 11, 42, 47, 48, 65, 66;
- F. 11, 12, 13, 14, 34;
- G. 17, 18, 20, 29, 31, 32, 34, 35, 36, 37, 38, 41, 43, 48, 57, 64;
- H. 52, 68, 85, 93, 94, 95, 96, 113, 114, 144, 152, 153, 163, 165,
- H. 183, 184, 185, 186, 187, 188, 189, 190, 191, 194, 202, 203, 204, 239;
- I. 4;
- J. 7, 20, 36, 37, 38;
- K. 25, 32, 42, 48, 49, 50, 66, 78, 79;
- L. 8, 11, 12, 14, 29, 48, 56, 57, 72, 77;
- M. 1, 6, 8, 68, 81, 88, 110, 112, 139, 145, 163, 172;
- N. 3, 21, 28;
- O. 24, 27, 37;
- P. 2, 22, 23, 27, 29, 30, 31, 32, 33, 36, 37, 39, 43, 48, 53, 64, 65,
- P. 68, 105;
- R. 63, 64, 67, 68, 69, 77, 79, 101, 102, 103, 105, 106, 107, 110, 112,
- R. 120, 133, 134;
- S. 1, 10, 12, 13, 21, 22, 25, 77, 81, 88, 111, 124, 125, 134, 135,
- S. 136, 137, 181, 183, 191, 192, 199, 212, 213, 214, 215, 216, 217, 218,
- S. 221, 224, 225, 272, 273, 286, 291, 293, 295, 333, 334, 336, 337,
- S. 340, 344, 345, 346, 348, 349, 350, 354, 355, 357, 373, 388, 389, 390,
- S. 392, 393, 395, 407, 408, 409, 420, 422, 423;
- T. 2, 8, 12, 13, 16, 17, 19, 20, 21, 33, 37, 38, 39, 40, 41, 42, 43,
- T. 45, 48, 54, 55, 57, 95, 107;
- U. 4;
- V. 8, 9, 10;
- W. 12, 45, 46, 63, 71, 80, 94, 95, 96, 109, 111, 112, 113, 135, 137,
- W. 138, 141, 147, 148, 149;
- Z. 10;

IV. INORGANIC NUTRIENTS, INCLUDING OXYGEN, CARBONDIOXIDE AND pH.

Aluminium (Al).

A. 44, 74, 193, 219; B. 29; C. 95, 112; E. 34, 35, 36, 37; F. 28;
G. 46; H. 14, 26; J. 1; K. 77; L. 51, 58, 61, 66, 69; M. 121, 130;
N. 1, 2; R. 132; S. 64, 160, 161, 228, 275, 288, 381, 383; V. 15;
W. 34, 146;

Arsenic (As).

A. 29; B. 144, 155, 172; C. 72, 73, 75, 90; H. 231; J. 10; K. 90;
L. 123; M. 4, 28; S. 379;

Barium (Ba).

C. 82, 83; M. 15; S. 69, 309, 413;

Beryllium (Be).

B. 15; H. 171; K. 71;

Bicarbonate (HCO_3^-).

L. 65; S. 385; W. 5, 6;

Boron (B).

A. 15, 16, 17, 43, 71, 77, 78, 80, 82, 83, 86, 88, 184, 224; B. 6, 40,
41, 53, 63, 64, 65, 66, 74, 76, 89, 90, 95, 101, 107, 108, 121, 123,
126, 165, 167, 172, 174, 178, 183, 184, 186, 189; C. 27, 30, 32, 89,
91, 114; D. 8, 9, 31, 41, 50, 76, 77, 80; E. 5, 7, 14, 15, 17, 43;
F. 2, 3, 9, 10, 21, 29; G. 5, 15, 49, 61, 81, 82, 83, 108, 109; H. 7,
8, 9, 18, 20, 22, 23, 24, 28, 67, 71, 89, 97, 154, 178, 224; J. 11,
28, 45, 47, 48; K. 31, 40, 69, 70, 71; L. 1, 2, 3, 32, 67, 79, 80,
82, 96, 101, 102, 105, 115, 122; M. 21, 25, 26, 28, 30, 32, 38, 41,
42, 43, 47, 48, 49, 67, 74, 80, 94, 108, 121, 124, 126, 132, 137,
150, 151; N. 32, 33; O. 3, 4, 6, 7, 40; P. 8, 9, 13, 66, 69, 113;
R. 40, 41, 43, 61, 123; S. 14, 18, 35, 41, 44, 50, 58, 61, 66, 68, 79,
80, 91, 93, 101, 106, 107, 108, 112, 115, 116, 117, 118, 119, 120,
123, 138, 143, 144, 145, 146, 156, 174, 190, 196, 201, 202, 203,
204, 205, 206, 207, 210, 211, 230, 257, 258, 260, 269, 280, 281,
329, 405, 418, 419; T. 6, 22, 60, 95, 96; V. 33; W. 10, 15, 23, 47,
48, 49, 51, 55, 89, 92, 98, 106, 107; Y. 1, 2, 8;

Bromine (Br).

O. 43; S. 367; W. 105;

Cadmium (Cd).

S. 54;

Calcium (Ca).

A. 35, 38, 56, 75, 220; B. 17, 21, 35, 61, 80, 82, 91, 113, 116, 131,
154, 186, 202, 212, 216, 233; C. 1, 4, 18, 22, 34, 83, 91, 111;
D. 16, 17, 18, 21, 22, 48; 73; E. 25, 26, 39, 40, 59; F. 1, 18;
G. 10, 14, 22, 49, 52, 69, 78, 79, 80, 86; H. 35, 45, 66, 71, 97, 140,
173, 192, 223, 225, 232; I. 1; J. 4, 24, 26, 32, 54; K. 4, 6, 7,
16, 61, 62, 63, 82; L. 1, 33, 35, 41; M. 54, 57, 67, 72, 97, 98,
102, 124, 141, 147, 166; N. 15, 20; O. 3, 4, 23; P. 12, 81, 92, 112;
R. 24, 34, 41, 59, 74, 82, 83, 100, 125; S. 16, 42, 89, 96, 99, 100,
114, 119, 139, 152, 154, 158, 164, 165, 167, 168, 171, 253, 282,
283, 324, 326, 370, 413, 415, 421; T. 6, 34, 35, 49, 78, 83, 91,
93, 105, 106; V. 26, 36; W. 4, 8, 32, 49, 54, 60, 61, 117;

- Carbondioxide (CO_2). -

Carbondioxide (CO₂).

A. 167, 174, 217; B. 213; C. 33; D. 39, 71; G. 23, 99, 110; H. 41;
J. 8; K. 29; L. 44; N. 12; R. 51; S. 317, 385;

Cesium (Cs).

B. 132; H. 86; M. 102;

Chlorine (Cl).

A. 2, 25, 216; B. 35, 36, 37, 209, 217, 237; C. 4, 109; E. 12, 30, 38,
E. 67, 68; G. 10; H. 25, 72, 74, 76, 78, 90, 236, 237; I. 5, 6, 11;
J. 12, 29, 35; K. 2; L. 33, 53, 69, 87, 88; O. 42, 43; R. 11, 33, 86,
R. 87; S. 95, 131, 175, 176, 178, 179, 180, 226, 249, 250, 399; T. 72,
T. 73, 79; V. 21, 22; W. 8, 69, 105; Z. 2;

Chromium (Cr).

G. 26; H. 102; K. 58; R. 95, 96; S. 59; W. 18;

Cobalt (Co).

A. 20, 153; B. 14, 137, 180; D. 75; H. 125, 128, 238; K. 64; M. 19,
M. 119, 121; S. 41, 51, 305; T. 98; V. 11;

Copper (Cu).

A. 81, 192, 195, 199, 210, 211; B. 5, 6, 123, 134, 147, 165, 166, 170,
B. 180, 201, 210, 234; C. 3, 4, 94, 110; E. 29, 50, 57, 58; H. 29, 33,
H. 34, 124, 130, 137, 162, 176, 212, 220; I. 7, 8; K. 5, 73; L. 35, 58,
L. 62, 68; M. 19, 21, 23, 28, 57, 58, 94, 117, 119, 121, 135, 138, 146,
M. 150, 153, 154, 155; N. 4; O. 13, 14, 15, 16, 22, 38; P. 44, 47, 70,
P. 74, 94; R. 25, 95, 96; S. 5, 41, 53, 65, 94, 132, 163, 205, 208,
S. 246, 267, 278, 284, 397; T. 66, 68, 77, 99; V. 3; W. 1; Z. 1;

Fluorine (F).

B. 32, 43; G. 100; L. 45; S. 39, 230; W. 105;

Gallium (Ga).

H. 125; L. 60; S. 313;

Indium (In).

L. 60;

Iodine (I).

C. 108; G. 90; H. 36; K. 70; L. 53, 54, 76; P. 97; S. 61, 68, 71, 72,
S. 254; W. 151;

Ion ratio.

A. 84, 225; B. 50, 199, 226; C. 14, 42; D. 11, 33, 57, 69; F. 8;
G. 52, 80; H. 53, 88, 97, 225, 235; K. 85, 88; M. 1, 167; O. 32, 34, 35;
P. 43, 67, 103, 104, 106; R. 3, 12, 40, 41; S. 16, 126, 127, 165, 170,
S. 171, 182, 185, 194, 238, 261, 274, 303, 370, 375; T. 49, 85, 97;
U. 1, 2; W. 3, 23, 70, 77, 78; Z. 10;

Ion uptake.

B. 197; C. 2; D. 28, 90; E. 26, 50; F. 41; H. 82, 195, 196, 197, 200;
L. 52, 111; M. 31, 101, 129; P. 56, 62; R. 45, 146; S. 95, 129, 130;
W. 4, 41, 42;

- Iron (Fe). -

Iron (Fe).

A. 1, 4, 30, 75, 81, 193, 218, 219; B. 28, 30, 68, 98, 99, 106, 195,
B. 201, 202, 219, 221, 236, 239; C. 14, 17, 26, 35, 36, 66, 104, 118;
D. 2, 29, 38; E. 50, 58; F. 32; G. 54, 55, 56, 62, 66, 106; H. 11, 33,
H. 34, 83, 98, 108, 109, 129, 206, 207, 212, 213, 214, 215, 216; I. 2;
J. 5, 19, 54, 56, 59, 60; K. 41, 55, 56, 71, 72, 81; L. 31, 41, 96;
M. 62, 63, 64, 66, 98, 118, 121, 138, 141; W. 25; O. 19, 21, 39; P. 18,
P. 94, 110; R. 21, 37, 60, 73, 75, 132; S. 41, 49, 67, 84, 85, 86, 87,
S. 102, 103, 104, 169, 208, 229, 230, 234, 236, 238, 241, 242, 248,
S. 271, 274, 305, 352, 368, 384, 403; T. 68, 75, 76, 91, 110; V. 3, 7;
W. 18, 31, 37, 57, 58, 59, 72, 83, 152, 153, 154;

Lead (Pb).

H. 40, 201; P. 99, 100, 101, 102; S. 63, 411;

Lithium (Li).

A. 40; E. 30; H. 48; M. 109; R. 19, 20; S. 52;

Magnesium (Mg).

A. 220; B. 20, 21, 80, 81, 82, 91, 113, 118, 130, 133, 225, 238;
C. 1, 4, 16; D. 1, 17, 18, 48, 73; E. 64; G. 13, 52, 69, 87; H. 2, 35,
H. 65, 70, 117, 150, 226; I. 9; J. 14, 16, 17; K. 16, 17, 20, 61, 62,
K. 71; L. 26, 28, 78, 114; M. 52, 72, 89, 152; N. 20, 34; P. 61, 103,
P. 104; R. 91, 92, 137; S. 16, 20, 34, 44, 45, 46, 47, 48, 57, 90,
S. 109, 114, 139, 154, 158, 164, 165, 167, 168, 169, 171, 175, 226,
S. 262, 270, 301, 319, 321, 324, 326; T. 6, 10, 83, 91, 97, 106;
V. 22, 23; W. 8, 36, 71; Z. 8;

Manganese (Mn).

A. 5, 19, 20, 23, 30, 67, 68, 69, 79, 195, 210; B. 6, 8, 27, 35, 57,
B. 86, 87, 93, 94, 123, 131, 147, 157, 165, 170, 195, 215, 229, 234;
C. 8, 14, 35, 65, 67, 77; D. 23, 46; E. 50, 57; F. 7, 20, 43; G. 23,
G. 24, 47, 100, 108, 109, 112; H. 11, 20, 47, 64, 89, 108, 133, 138,
H. 156, 208, 210, 211, 212, 213; J. 10, 57, 61; K. 8, 21; L. 31, 38,
L. 78, 84, 85, 86, 94, 95, 106, 118, 123, 135, 141, 142, 150; N. 25;
O. 17, 18, 20, 39; P. 14, 18, 69, 72, 73, 89, 94; R. 73, 80, 98, 128,
R. 129, 130; S. 20, 41, 56, 75, 85, 112, 190, 229, 230, 238, 267,
S. 274, 376, 381, 397, 403, 404, 419; T. 68, 76, 104, 109, 110;
V. 3, 28, 29, 31; W. 54, 57, 72, 76, 79, 97, 98, 99, 153; Y. 8; Z. 7;

Mercury (Hg).

B. 139;

Miscellaneous.

A. 156, 157, 158, 186; B. 59, 128, 146, 232, 233; C. 107, 119, 123;
D. 79, 86; F. 44; G. 89; H. 132, 167; J. 21; K. 30, 38, 54; L. 55, 74,
L. 91; M. 6, 55, 136; R. 45, 111; S. 2, 128, 157, 161, 417; T. 21, 48;
V. 14, 34; W. 44, 114;

Mode of application of nutrients.

A. 97, 98, 118, 144, 146, 152, 159, 165, 185; B. 91, 218; C. 85;
F. 5; H. 166; K. 50, 59; N. 29; O. 22, 37; P. 25, 35; R. 54; S. 302,
S. 303, 341, 391; T. 18; W. 110, 140; Z. 19;

- Molybdenum (Mo). -

Molybdenum (Mo).

A. 6, 7, 8, 9, 10, 11, 12, 13, 14, 62, 212; B. 124, 134, 135, 150, 151, 185, 220; C. 7, 8, 94; D. 42, 45, 70; E. 61, 62, 63; H. 33, 34, 47, 109, 111, 112, 117, 118, 120, 122, 123, 126, 127, 130, 131, 132, 133, 134, 135, 136, 137, 162, 164; J. 23, 26, 27, 31, 34; K. 72, 73, 81; M. 99, 119, 120, 121, 122, 138, 156, 158; O. 5; P. 70, 71, 93, 94, 95; R. 95, 96; S. 41, 55, 254, 311, 312, 400, 401; V. 5; W. 50, 52, 53, 54, 56, 57, 58, 59;

Nickel (Ni).

B. 180; C. 108, 117, 118; F. 47; H. 125; M. 19, 119, 121; P. 17; S. 51; V. 11;

Nitrogen (N).

A. 6, 7, 8, 9, 10, 11, 12, 13, 14, 30, 38, 44, 62, 75, 78, 82, 183, 184, 195, 197, 217, 218; B. 1, 3, 4, 7, 34, 35, 40, 55, 103, 106, 109, 113, 141, 145, 151, 187, 189, 204, 220, 227, 228, 229, 230; C. 4, 7, 40, 42, 43, 51, 59, 61, 63, 77, 80, 81, 93, 121, 122, 125, 127; D. 12, 17, 33, 35, 44, 53, 63, 70; E. 10, 52, 59, 64; F. 8; G. 45, 51, 67, 68, 87, 88; H. 2, 19, 42, 45, 70, 109, 117, 123, 134, 135, 136, 177, 179, 198, 199, 224, 236; I. 10; J. 4, 9, 22, 23, 25, 26, 27, 52, 56, 57, 59, 60; K. 15, 72, 80, 81; L. 49, 104; M. 12, 31, 83, 99, 122, 140, 146, 152, 156, 157, 158; N. 12, 15, 23, 29; P. 19, 75, 76, 79, 103, 104, 109, 110; R. 94, 100; S. 19, 20, 79, 100, 110, 113, 144, 145, 175, 179, 190, 231, 233, 234, 236, 237, 239, 260, 268, 270, 296, 297, 312, 315, 380; T. 1, 4, 78, 86, 100; V. 20, 21, 28, 29; W. 7, 22, 39, 40, 53, 73, 77, 78, 88, 116, 117, 118, 119, 125, 140; Y. 6; Z. 2, 4, 5;

Oxygen (O₂).

A. 46, 50, 51, 52, 64, 65, 66, 195, 217; B. 48, 104, 158; C. 9, 10, 60, 70, 124; D. 2, 66, 87; E. 56; F. 31, 35; G. 50, 51, 97, 111; H. 41, 218; K. 45, 68; L. 44, 64, 65, 92, 109, 110; M. 32; P. 55, 56, 85, 88; R. 1, 117; S. 17, 148, 188, 194, 338, 339, 342, 347, 374; T. 9; V. 24, 25; W. 44, 68, 108; Z. 9;

Palladium (Pd).

B. 15, 176;

pH. (acidity).

A. 35, 39, 54, 75, 127, 174, 187, 195, 201, 207, 215; B. 28, 104, 147, 230, 234; C. 34, 61, 63, 64, 95; D. 5, 12, 49, 78; E. 10; F. 5; G. 1, 107; H. 21, 72, 157, 214, 215, 228; I. 2; J. 1, 60; K. 22, 55; L. 107; M. 3, 64, 105, 147; O. 28; P. 75, 76; R. 131; S. 33, 99, 141, 173, 227, 234, 288, 319, 324, 326, 403; T. 85, 86; U. 3; V. 2; W. 38, 40, 53, 59, 76, 77, 78; Z. 7, 11;

Phosphorum (P).

A. 26, 219; B. 20, 24, 32, 34, 61, 98, 99, 113, 187, 188, 204; C. 116, 121, 122; D. 17, 18, 53, 72; E. 24, 27, 55; F. 26, 32; G. 4, 13, 25, 67, 68; H. 2, 14, 20, 42, 193, 221, 231; I. 10; J. 17, 59; K. 18, 65; L. 39, 89, 103; M. 52, 63, 103, 128, 140, 141, 144, 152; O. 41; P. 6, 20, 41, 93, 103, 104, 110; R. 28, 92, 100; S. 19, 20, 39, 73, 133, 142, 152, 160, 164, 210, 248, 262, 279, 352, 370, 379, 384, 398, 401, 406; T. 11, 97; W. 34, 39, 117, 126, 139, 146; Y. 2;

- Potassium (K). -

Potassium (K).

A. 55, 56, 183, 184; B. 21, 33, 34, 113, 169, 237; C. 1, 4, 18, 80, 91, 98, 99, 121, 122; D. 17, 18, 33, 38, 53, 91; E. 64; F. 8; G. 14, 79; H. 3, 4, 17, 20, 35, 36, 41, 45, 61, 62, 63, 70, 129, 140, 181, 225, 232; J. 12, 13, 29, 49, 54; K. 4, 6, 71; L. 76, 103; M. 40, 54, 102, 140, 152, 169; O. 31; P. 17, 20, 81, 86, 103, 104, 110; R. 34, 40, 41, 55, 56, 87; S. 19, 20, 37, 42, 44, 45, 46, 47, 48, 49, 52, 57, 62, 67, 90, 133, 139, 171, 177, 210, 235, 239, 270, 321, 384, 398, 414; T. 25, 34, 52; V. 22, 23; W. 23, 26; Z. 20;

Radium (Ra).

A. 18; D. 58; N. 35;

Rubidium (Rb).

B. 91, 92, 132, 176; H. 232; M. 102; O. 41; P. 82; R. 55, 56; S. 52, 367;

Selenium (Se).

A. 223; B. 47, 125; G. 59, 60; H. 229, 230, 233, 234; K. 34; L. 50; M. 70, 71, 73, 143; N. 8; S. 70, 298; T. 80, 81, 82, 87, 88;

Silicon (Si).

A. 4, 24, 37; B. 1, 182; D. 29, 30, 72; G. 40; I. 9, 10; L. 39, 69; O. 8, 9, 10, 11, 12, 31; R. 8; S. 66, 275, 294; W. 11, 90, 91, 99, 142; Y. 4, 5;

Sodium (Na).

A. 25, 221; B. 3, 4, 7, 23, 47, 169, 188, 205, 217, 237; C. 4, 99, 109; D. 91; E. 39, 40, 67, 68; G. 10, 45, 59, 60, 111; H. 27, 35, 51, 61, 62, 63, 73, 75, 78, 90, 181, 205, 224; I. 1, 11; K. 6, 90; L. 33, 37, 40, 42, 64, 67, 87, 88, 117; M. 40, 169; P. 104; R. 11, 24, 34, 61, 125; S. 37, 42, 62, 95, 110, 113, 139, 226, 380, 398; T. 34, 35, 78; V. 12, 23; W. 5, 8, 28, 142;

Strontium (Sr).

C. 4, 83; H. 66, 232; M. 15, 102; S. 69, 413;

Sulfur (S).

A. 1, 62, 187, 222, 223; B. 11, 225; C. 16, 47, 79; D. 18, 81; E. 12, 16, 18, 19, 20, 21, 23, 52, 53, 54; F. 40; G. 10; H. 2, 56, 73, 74, 76, 78, 84, 229, 230, 234; I. 6; J. 56, 59; M. 53, 100, 129; N. 7, 17; O. 12, 29; P. 103, 104; S. 131, 176, 309, 401, 412, 416; T. 28, 29, 30, 31, 74, 77; V. 21; W. 8, 119;

Tellurium (Te).

M. 71; S. 70;

Thallium (Tl).

B. 152, 153; M. 33; P. 102; S. 172, 290;

Titanium (Ti).

S. 230;

Total salt concentration.

A. 59, 61, 80, 84, 139, 225; B. 111, 142, 149, 168, 173; C. 93; D. 78, 79; E. 9, 13; F. 27, 39; G. 11, 30, 42, 70, 95; H. 77, 91, 139, 158, 159, 160; I. 11; K. 43; L. 100, 102, 107; M. 45, 51; N. 16; O. 1, 25, 26, 27, 28; P. 21, 28, 40, 52, 84; R. 12, 18, 44, 78; S. 7, 9, 78, 109, 183, 184, 186, 187, 197, 198, 232, 240, 279, 298, 331, 341, 372, 375, 416, 320; T. 71, 102; V. 13, 37; W. 19, 20, 42, 86, 128; Y. 7;

- Vanadium (V). -

Vanadium (V).

A. 213; B. 84, 85, 150, 220; D. 75; G. 27, 28; S. 60; W. 54, 57, 58;

Various macro elements.

A. 28, 39, 45, 57, 70, 73, 76, 89; B. 22, 73, 117, 136, 138, 143, 194,
B. 198, 223, 227, 228, 231; C. 2, 19, 30, 38, 39, 57, 74, 85, 88, 100;
D. 10, 11, 25, 27, 28, 43; E. 28, 60; F. 17, 19, 33, 36, 37, 38;
G. 12, 63, 71, 95; H. 3, 4, 5, 16, 30, 38, 39, 103, 104, 105, 106, 172,
H. 235; I. 12; J. 6, 21; K. 9, 27, 89; L. 30, 55, 72, 73, 81, 108, 116,
L. 120; M. 9, 13, 34, 35, 36, 50, 55, 75, 83, 107, 125; N. 30; O. 2, 34,
P. 59, 62, 77, 83; R. 15, 16, 23, 44, 85, 111; S. 15, 124, 125, 140,
S. 149, 150, 256, 266, 300, 310, 311, 327, 364; T. 2, 3, 36, 70, 92, 94,
T. 108; V. 13, 17, 18; W. 29, 31, 56, 67, 70, 87, 93, 100, 129, 143,
W. 145; Y. 3; Z. 18;

Various micro elements.

A. 22, 26, 27, 57, 70, 73, 76, 89, 90, 192, 193, 196, 211; B. 3, 15,
B. 16, 29, 57, 73, 83, 88, 120, 122, 127, 136, 149, 171, 175, 177, 179,
B. 181, 182, 194, 198, 205, 227, 228, 231; C. 2, 5, 19, 30, 38, 39, 74,
C. 85, 88, 100, 128; D. 10, 11, 25, 43, 54, 58, 59, 60, 61, 62, 63, 64;
E. 28, 49, 60; F. 6, 10, 17, 19, 33, 36, 37, 38, 39; G. 12, 16, 45, 63,
G. 71, 94, 96, 113; H. 3, 4, 16, 30, 38, 39, 43, 44, 55, 80, 87, 88,
H. 100, 103, 104, 105, 110, 114, 115, 116, 128, 143, 148, 172, 174, 175, 227,
H. 235; I. 5, 12; J. 6, 14, 18, 21; K. 26, 27, 28, 56, 86, 89; L. 17,
L. 30, 36, 45, 46, 55, 71, 72, 73, 81, 93, 108, 119, 121; M. 34, 35,
M. 36, 50, 55, 75, 77, 83, 86, 104, 107, 125; N. 5, 6, 9, 18, 19, 26,
N. 30, 35; O. 2, 34; P. 5, 7, 59, 77, 78, 83, 108; R. 15, 16, 22, 30,
R. 53, 81, 85, 87, 111, 135; S. 7, 15, 36, 38, 43, 55, 66, 105, 110,
S. 113, 121, 122, 150, 164, 166, 169, 177, 195, 209, 256, 263, 265, 277,
S. 292, 297, 300, 304, 305, 315, 317, 327, 328, 396, 417; T. 2, 36, 50,
T. 61, 62, 63, 70, 92, 108; V. 13, 17, 18; W. 29, 67, 70, 93, 100, 129,
W. 145; Y. 10, Z. 3, 6, 14, 18;

Zinc (Zn).

A. 81, 210, 224; B. 6, 77, 78, 79, 119, 157, 172, 203; C. 15; E. 1, 44,
E. 45, 50; F. 47; G. 84, 85, 100; H. 124, 136, 137, 168; J. 14, 15;
K. 3, 9; L. 46, 89; M. 19, 21, 22, 23, 28, 63, 94, 119, 121; P. 70, 94;
Q. 1; R. 25, 27, 28, 29, 31, 61, 95, 96; S. 20, 41, 54, 206, 259, 261,
S. 264, 267, 276, 280, 305, 309, 397; T. 59, 64, 68, 101, 102, 103;
V. 32; W. 102, 122, 123; Y. 8;

V. SUBSTRATES AND THEIR PROPERTIES.

Charcoal.

V. 6;

Fixation and exchanging of nutrients by substrates.

A. 4, 49, 200, 202, 204, 208, 215; B. 2, 208; C. 56, 62; D. 68; E. 22;
G. 8, 41, 72; H. 106, 182; J. 6; K. 44; M. 29, 44; P. 59, 60; S. 75,
S. 76, 152; W. 9;

Peat.

A. 89, 111, 136, 141, 160, 164, 176; B. 214; F. 20; G. 58, 75, 76;
H. 35; K. 75, 76; L. 35; M. 146; O. 3, 4, 5, 6, 13, 15; P. 34, 42, 44,
P. 45, 46, 47, 50, 51; R. 38, 39, 44; W. 37, 103;

Physical properties of substrates.

A. 3; C. 56; E. 9; F. 16; H. 32, 77; K. 41; L. 90; M. 29, 124;
P. 40, 105; R. 121; S. 23, 182; W. 153, 154;

Slags.

A. 107, 132;

Sphagnum.

A. 180; O. 3, 4, 5, 6; R. 108; S. 8;

Vermiculite.

A. 49; B. 70, 71; C. 13, 106; G. 72; J. 2, 62; K. 43, 44; M. 39, 162,
M. 164; P. 87, 111; R. 66, 97, 109; S. 23; W. 13, 14, 103;

VI. WATERRELATIONS.

A. 3, 59; B. 38, 142, 196, 211; D. 70; G. 97; E. 9; H. 57, 200;
J. 53; K. 22; L. 32, 59, 90, 105; N. 14; R. 118; S. 187; T. 102;
V. 24; W. 43;

VII. USE OF ORGANIC COMPOUNDS.

Antibiotics.

G. 73; M. 84, 144, 149; N. 23; P. 98, 104; S. 378; T. 77; W. 104, 118;

Chelates.

A. 26, 27; B. 163, 235; C. 17, 26; E. 45; G. 12; H. 80, 98, 180;
J. 5; K. 57; P. 57; S. 74, 82, 151, 368; W. 21, 24, 25, 26, 27, 73,
W. 74, 75, 83;

Enzymes.

B. 201; C. 113; D. 26, 80; F. 25; N. 4, 5; P. 13, 14; Q. 1; T. 24;
V. 4; W. 107, 151; Y. 3;

Gibberellins.

A. 181; L. 4, 5; M. 69; W. 115;

Growth inhibitors.

B. 144; C. 100; R. 98; S. 174; T. 24;

Growth promoters.

A. 58; B. 75, 159, 171; C. 64, 68, 126; H. 155; L. 47, 112; M. 132;
R. 131; S. 259; T. 101;

Various organic matter.

B. 161, 219, 221; C. 28, 29, 48; F. 22; G. 111; H. 122, 219; I. 1;
K. 72; L. 64; M. 63, 86; N. 29; P. 91; R. 2; S. 4, 45, 251, 262,
S. 322, 402, 406; T. 5, 98; V. 22, 33;

VIII. TEMPERATURE.

A. 1, 133; B. 67; C. 6; D. 53; G. 39; K. 43; L. 10; P. 62, 92; R. 84;
S. 210, 356; T. 84; W. 41, 42; Z. 4;

IX. INFLUENCES ON PHYSIOLOGICAL PROCESSES AND ORGANIC COMPOUNDS IN PLANTS.

Ascorbic acid.

A. 6, 11; G. 81; H. 36, 44, 69, 120, 156; L. 118, 122; M. 80, 82;
N. 29; R. 128, 129, 130; S. 175; T. 98; W. 67;

Carbohydrate.

A. 7; B. 36, 55, 133; F. 24; G. 6, 83; J. 13, 32; K. 15; N. 29;
S. 144, 146, 233, 234; W. 89;

Carotene.

B. 198; H. 2; K. 31; M. 9; S. 40;

Chlorophyll.

A. 11; B. 236; E. 53; H. 65, 117; I. 5; K. 20; M. 52, 96;
O. 14, 15, 16; S. 168, 234, 262, 384; Z. 1;

Phosphatase.

H. 171;

Photosynthesis.

B. 41, 67, 138; C. 9; D. 3; G. 23, 24, 93; H. 140; K. 19, 20, 43;
L. 5; M. 42, 89; N. 21; O. 13; R. 31; S. 405; U. 5, 6; W. 48;

Sugars.

A. 12, 216; P. 86; T. 9; V. 23; W. 82, 86;

Various organic acids.

A. 14, 75; B. 75; C. 79; D. 4; E. 7; F. 23, 24, 25, 26; G. 104;
H. 133; L. 35, 93, 94, 95; M. 43, 132; P. 55, 67, 94, 95, 110;
R. 17; S. 180; T. 68, 81;

Various vitamins.

A. 153, 198; B. 154; C. 119, 120; D. 90; H. 140; L. 73, 112, 119, 121;
S. 78, 193; T. 70;

X. DISEASES AND PEST-CONTROL.

A. 23, 57, 61, 102; B. 52, 120, 164, 166, 178, 179; F. 30, 45; G. 73;
H. 10, 15, 18, 82, 121, 176; I. 9; L. 30, 120; M. 44, 116, 154, 168;
N. 8; P. 72, 91; R. 12, 78, 89, 122, 136, 137; S. 14, 72, 80, 245,
S. 369, 371; T. 6, 10, 111; W. 15, 16, 17, 35, 79, 106, 116;

XI. VARIOUS SUBJECTS.

A. Miscellaneous.

A. 145, 186, 194; B. 205; C. 92; D. 65, 86; H. 223; K. 54;
R. 111; S. 2, 128;

B. Nutritive value of soilless culture.

A. 135, 209; D. 43; R. 23;

C. Saving labour and economical aspects.

A. 129, 142, 148, 166, 169, 203; F. 13; K. 59; M. 171; P.
P. 15, 37, 39, 54; R. 48, 49, 50.

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