

***Neurospora crassa* genetic maps and mapped loci (January, 2000)**

David D. Perkins. Department of Biological Sciences, Stanford University, Stanford, California 94305-5020

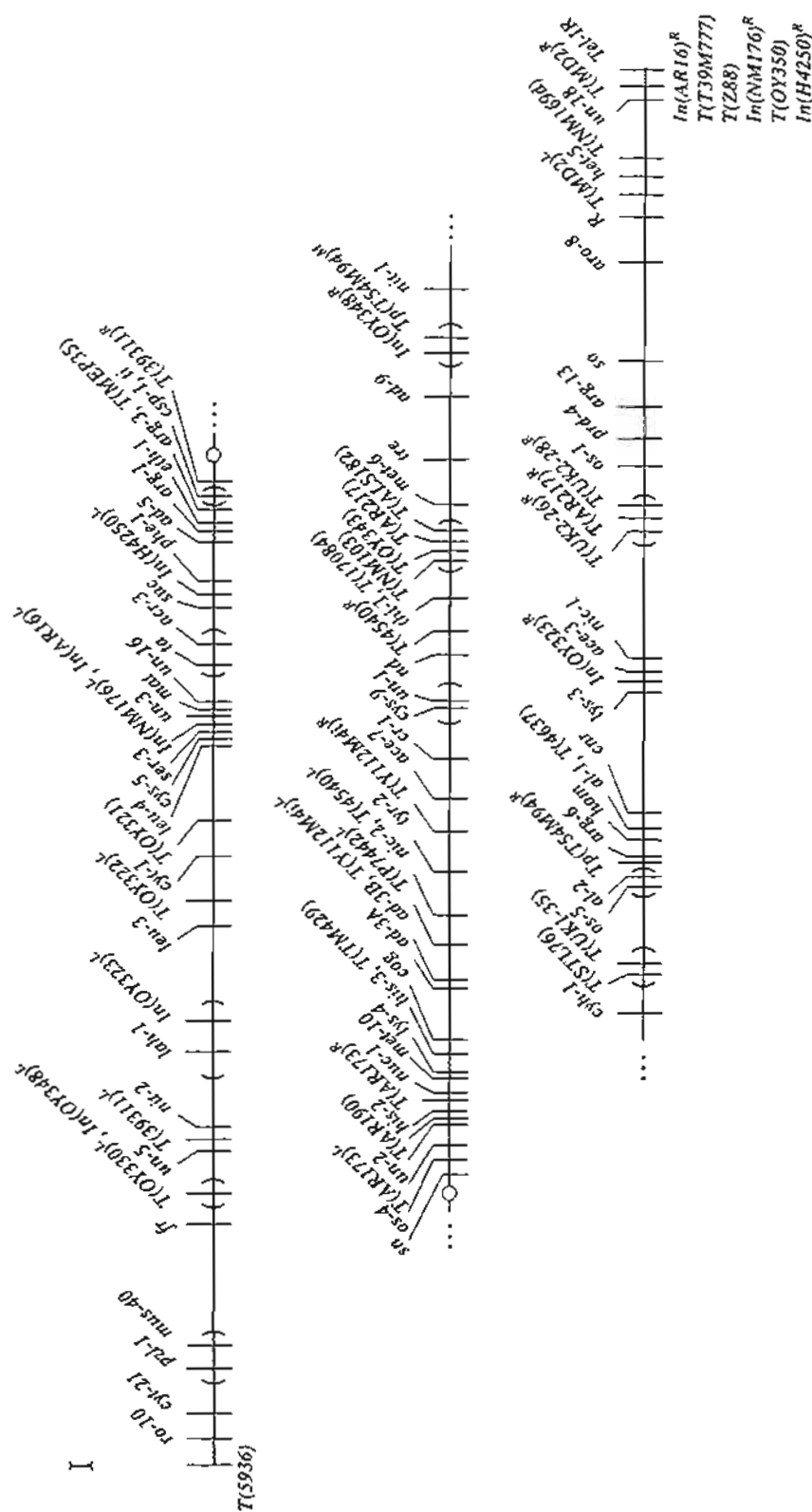
**Maps.** Loci are displayed only if their order is established with reasonable certainty, either from meiotic crossing over, multiple-point crosses, from duplication coverage, or by physical mapping. Loci are not displayed but are listed below the maps if their order is uncertain relative to the loci that are shown, except that closely linked loci may sometimes be shown in parentheses on the map even if their relative order is unknown. Evidence for linkage is given in the lists and is referenced in the new compendium (Perkins, Radford, and Sachs 2000 *Chromosomal Loci of Neurospora crassa*. Academic Press). Crossover values and interval lengths are approximations. Numbers on which they are based are often small and the various stocks used for mapping differ in genes that affect meiotic recombination. Linkage group I is estimated to be at least 200 map units long and the total for all seven groups probably exceeds 1000.

Rearrangement breakpoints are shown only if their map position has been determined precisely. Insertional and quasiterminal rearrangements are usually the best mapped. Many of these duplication-generating rearrangements have been instrumental in determining the order of flanking gene loci by means of duplication-coverage tests. When a rearrangement involves more than one break in the same chromosome, the breakpoints are distinguished by superscripts *L* (left), *R* (right), or *M* (middle). Symbols for rearrangements with quasiterminal breakpoints are shown below the relevant linkage-group tip. Rearrangement symbols are abbreviated. For example, *T(IL→IR)39311* is shortened to *T(39311)*. Full symbols can be found in the FGSC Stock List or in Perkins, D. D., *Advan. Genet.* 36:239-398 (1997), where descriptions and linkage relations of 355 chromosome rearrangements are given.

**Lists:** Accompanying the map of each linkage group is a list of all the loci known with reasonable certainty to be located in that group. These are ordered alphabetically by locus symbol. Neither the maps nor the lists include anonymous RFLP and RAPD markers. Recombination percentages and numerical fractions are from random ascospore progeny. When data are from asci, the numbers of tetratype (T) and nonparental ditype (NPD) asci are given, together with the total number. In statements with the format "Locus *c* is between *a*, *b* and *d*, *e*", the word "and" separates markers to the left of *c* from markers to the right. If synonyms exist, only the preferred symbol is given. Names, references, synonyms, and a documented description of each locus will be found in the new compendium. Over 1000 loci have now been assigned to linkage group.

For background and references see Perkins and Barry 1977 *Advan. Genet.* 19:133-285, Perkins 1997 *Advan. Genet.* 36:239-398 (cytogenetics, chromosome rearrangements); Perkins 1986 *J. Genet.* 65:121-144 (mapping by duplication coverage); Perkins 1999 *Fungal Genet. Newslett.* 46:34-41 (genetic nomenclature),

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# LOCUS IN LINKAGE GROUP I

|              |                                                                                                             |                      |                                                                                                          |
|--------------|-------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------|
| <i>aap-2</i> | Linked to <i>al-2</i> (0T/18 asci).                                                                         | <i>arg-1</i>         | Between <i>ad-5</i> (1%) and <i>eth-1</i> (<1%).                                                         |
| <i>ace-3</i> | Between <i>lys-3</i> ( $\leq$ 1%) and <i>trp-1</i> (<1%).                                                   | <i>arg-3</i>         | Between <i>eth-1</i> (1%) and <i>cys-1</i> (1%), <i>T(39311)</i> <sup>R</sup> .                          |
| <i>ace-7</i> | Between <i>nic-2</i> (4%; 7%) and <i>cr-1</i> (1%; 3%).                                                     | <i>arg-6</i>         | Between <i>al-2</i> (1 or 2%), <i>Tp(T54M94)</i> <sup>R</sup> and <i>hom</i> (1%), <i>al-1</i> (1%, 4%). |
| <i>acr-1</i> | Linked to <i>mat</i> (8%; 12%).                                                                             | <i>arg-13</i>        | Between <i>os-1</i> (1%) and <i>so</i> (2%, 12%).                                                        |
| <i>acr-3</i> | Between <i>un-16</i> (1%; 5%) and <i>suc</i> (1%; 5%).                                                      | <i>arg-7</i>         | Between <i>arg-1</i> (4%) and <i>his-3</i> (1 or 2%).                                                    |
| <i>acr-4</i> | Linked to <i>mat</i> , <i>acr-3</i> (5%).                                                                   | <i>atr-1</i>         | Between <i>suc</i> (0/39), <i>In(H4250)</i> <sup>L</sup> and <i>T(39311)</i> <sup>R</sup> .              |
| <i>acu-4</i> | Right of <i>arg-1</i> (5/29).                                                                               | <i>aza-1</i>         | Left of <i>mat</i> (23%).                                                                                |
| <i>ad-3A</i> | Between <i>his-3</i> (1%; 3%) and <i>ad-3B</i> (<1%).                                                       | <i>aza-2</i>         | Linked to <i>mat</i> (2%), <i>aza-1</i> (39%).                                                           |
| <i>ad-3B</i> | Between <i>ad-3A</i> (<1%) and <i>T(P7442)</i> <sup>L</sup> , <i>mic-2</i> (3%).                            | <i>B<sup>m</sup></i> | Left of <i>mat</i> (14%).                                                                                |
| <i>ad-5</i>  | Between <i>phe-1</i> and <i>arg-1</i> (1%).                                                                 | <i>Ban</i>           | Linked to <i>un-1</i> (9%), probably to the right.                                                       |
| <i>ad-9</i>  | Between <i>ire</i> (7%) and <i>Tp(T54M94)</i> <sup>M</sup> , <i>In(OY348)</i> <sup>R</sup> , <i>nit-1</i> . | <i>bs-1</i>          | Linked to <i>cys-9</i> (10%), <i>un-1</i> (10%).                                                         |
| <i>al-1</i>  | Between <i>hom</i> (1%) and <i>cnr</i> (1%).                                                                | <i>ca-1</i>          | Linked to <i>ca-1</i> (5%), <i>cys-9</i> , <i>un-1</i> (10%).                                            |
| <i>al-2</i>  | Between <i>cyl-1</i> (8%; 13%), <i>T(STL76)</i> and <i>Tp(T54M94)</i> <sup>R</sup> , <i>arg-6</i> (1%).     | <i>ca-3</i>          | Between <i>mat</i> (0/18; 3T/18 asci) and <i>Cen-1</i> (2T/18 asci).                                     |
| <i>amyc</i>  | Between <i>ad-5</i> and <i>Cen-1</i> .                                                                      | <i>cag-4</i>         | Between <i>arg-3</i> (2%), <i>T(39311)</i> <sup>R</sup> and <i>sn</i> (<1%), <i>os-4</i> .               |

## LOCI IN LINKAGE GROUP I (continued)

|                   |                                                                                           |
|-------------------|-------------------------------------------------------------------------------------------|
| <i>cjs(OY305)</i> | Between <i>mat</i> and <i>al-2</i> .                                                      |
| <i>cjs(OY306)</i> | Linked to <i>al-2</i> , probably to the right.                                            |
| <i>cjs(OY307)</i> | Between <i>mat</i> and <i>al-1</i>                                                        |
| <i>chs-4</i>      | Linked to <i>leu-4</i> , <i>mat</i> , <i>arg-3</i> (0/18).                                |
| <i>cnr</i>        | Between <i>hom</i> (1%), <i>al-1</i> and <i>In(OY323)<sup>R</sup></i> , <i>lys-3</i> .    |
| <i>cog</i>        | Between <i>his-3</i> (1%, 3%, 3kb) and <i>ad-3A</i> (2%, 7%).                             |
| <i>col-12</i>     | Linked to <i>mat</i> (17%; 22%).                                                          |
| <i>con-8</i>      | Linked to <i>phr</i> (0/18), <i>nic-1</i> (4/18).                                         |
| <i>cpd-2</i>      | Right of <i>arg-1</i> (6%).                                                               |
| <i>cpd-3</i>      | Right of <i>arg-1</i> (11%).                                                              |
| <i>cr-1</i>       | Between <i>ace-7</i> (1%, 3%) and <i>cys-9</i> (3%), <i>un-1</i> (5%).                    |
| <i>cr-2</i>       | Between <i>T(NM103)</i> and <i>al-2</i> (18%).                                            |
| <i>cr-3</i>       | Between <i>T(4540)<sup>R</sup></i> and <i>cr-2</i> .                                      |
| <i>crp-7</i>      | Linked near <i>con-8</i> .                                                                |
| <i>Csh</i>        | Between <i>thi-1</i> (12%; 20%) and <i>ad-9</i> (5%).                                     |
| <i>csp-1</i>      | Between <i>arg-3</i> (1%) and <i>T(39311)<sup>R</sup></i> .                               |
| <i>csp-1</i>      | Between <i>his-2</i> (20%) and <i>cyh-1</i> (1%, 3%).                                     |
| <i>cy</i>         | Linked to <i>ad-5</i> (1/54), probably to the left.                                       |
| <i>cyh-1</i>      | Linked to <i>mat</i> (6%).                                                                |
| <i>cyh-1</i>      | Between <i>nir-1</i> (6%) and <i>T(STL76)</i> , <i>al-2</i> (8%; 13%).                    |
| <i>cys-5</i>      | Between <i>leu-4</i> and <i>ser-3</i> (<1%).                                              |
| <i>cys-9</i>      | Between <i>cr-1</i> (3%) and <i>nd</i> , <i>T(4540)<sup>R</sup></i> , <i>thi-1</i> (13%). |
| <i>cys-11</i>     | Linked to <i>cys-5</i> (<1%), probably to the right.                                      |
| <i>cys-12</i>     | Linked to <i>al-1</i> or <i>al-2</i> (0/76). Right of <i>ad-9</i> (12%).                  |
| <i>cys-13</i>     | Right of <i>nic-2</i> , <i>cyr-2</i> , <i>T(112M41)<sup>R</sup></i> .                     |
| <i>cyt-1</i>      | Between <i>leu-3</i> (5%, 8%) and <i>T(OY321)</i> , <i>leu-4</i> .                        |
| <i>cyt-18</i>     | Between <i>T(AR173)</i> breakpoints.                                                      |
| <i>cyt-20</i>     | Linked to <i>al-2</i> (10%), <i>nic-1</i> (1%, 5%).                                       |
| <i>cyt-21</i>     | Linked to <i>mat</i> (<1%).                                                               |
| <i>dgr-2</i>      | Between <i>ro-10</i> (1%) and <i>nir-2</i> (5/18).                                        |
| <i>dgr-4</i>      | Right of <i>arg-1</i> (2%). Linked to <i>csp-1</i> (1%).                                  |
| <i>dir</i>        | Linked to <i>al-2</i> (1%), probably to the left.                                         |
| <i>dot</i>        | Right of <i>pa</i> .                                                                      |
| <i>eat-1</i>      | Linked to <i>ad-9</i> (0/44). Right of <i>thi-1</i> (2%).                                 |
| <i>eat-2</i>      | Right of <i>mat</i> . Between <i>mat</i> and <i>eat-2</i> .                               |
| <i>eat-3</i>      | Right of <i>mat</i> . Between <i>eat-1</i> and <i>eat-3</i> .                             |
| <i>eat-4</i>      | Right of <i>mat</i> . Between <i>eat-2</i> and <i>eat-4</i> .                             |
| <i>eat-5</i>      | Right of <i>mat</i> and <i>eat-3</i> .                                                    |
| <i>eat-6</i>      | Left of <i>mat</i> . Between <i>eat-6</i> and <i>mat</i> .                                |
| <i>En(pdx)</i>    | Left of <i>mat</i> . Between <i>un-3</i> and <i>eat-5</i> .                               |
| <i>erg-4</i>      | Linked to <i>mat</i> (5%), probably to the left.                                          |
| <i>esr-2</i>      | Linked to <i>al-1</i> (10%).                                                              |
| <i>elh-1</i>      | Linked to <i>mat</i> (10%).                                                               |
| <i>exo-1</i>      | Between <i>arg-1</i> (<1%) and <i>arg-3</i> (<1%).                                        |
| <i>ff-3</i>       | Right of <i>os-1</i> (3%).                                                                |
| <i>fls</i>        | Between <i>nir-1</i> (5%, 19%) and <i>al-1</i> (6%; 19%).                                 |
| <i>fmf-1</i>      | Between <i>mat</i> (2%, 15%) and <i>al-1</i> (6%; 19%).                                   |
| <i>fpr-5</i>      | Left of <i>al-2</i> (25%).                                                                |
| <i>fr</i>         | Between <i>ro-10</i> (18%) and <i>T(OY330)<sup>R</sup></i> , <i>un-5</i> (6%).            |

|                                |                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <i>fs-3</i>                    | Left of <i>mat</i> (16%).                                                                                                      |
| <i>Fsp-2</i>                   | Right of <i>nic-2</i> (6%).                                                                                                    |
| <i>Fsr-1</i>                   | Linked to <i>met-6</i> , <i>ad-9</i> , <i>al-2</i> <i>arg-6</i> (0/18).                                                        |
| <i>Fsr-12</i>                  | Linked to <i>nir-2</i> (0 or 1/16), <i>vma-4</i> (0 T/18 asci).                                                                |
| <i>Fsr-18</i>                  | Linked to <i>nic-1</i> (0/18), <i>arg-13</i> (2 T/18 asci).                                                                    |
| <i>Fsr-30</i>                  | Linked to <i>mat</i> (0 T/18 asci).                                                                                            |
| <i>Fsr-33</i>                  | Linked to <i>lys-4</i> (0 or 1 T/18 asci).                                                                                     |
| <i>gap-1</i>                   | Between <i>mat</i> (6%) and <i>Cen-1</i> (4%).                                                                                 |
| <i>gla-2</i>                   | Linked to <i>mat</i> (3/68), <i>sor-4</i> (≤10kb), <i>his-3</i> (3/65).                                                        |
| <i>glp-1</i>                   | Probably between <i>ad-9</i> (2%) and <i>nir-1</i> (11%).                                                                      |
| <i>glp-5</i>                   | Left of <i>cr-1</i> (15%).                                                                                                     |
| <i>grp78</i>                   | Linked to <i>mat</i> (0 T/18 asci).                                                                                            |
| <i>gsp</i>                     | Left of <i>mat</i> (10%).                                                                                                      |
| <i>gua-1</i>                   | Probably between <i>his-2</i> (3%) and <i>cr-1</i> (3%).                                                                       |
| <i>hda-2</i>                   | Linked to <i>arg-13</i> (2 T/18 asci).                                                                                         |
| <i>het-5</i>                   | Between <i>R</i> , <i>T(MD2)<sup>R</sup></i> and <i>T(NM169d)</i> , <i>un-18</i> , <i>T(MD2)<sup>R</sup></i> .                 |
| <i>his-2</i>                   | Between <i>un-2</i> (<1%), <i>T(AR190)</i> and <i>T(AR173)<sup>R</sup></i> , <i>nuc-1</i> (<1%).                               |
| <i>his-3</i>                   | Between <i>met-10</i> , <i>lys-4</i> (1%) and <i>cog</i> (1%, 3%), <i>ad-3A</i> (1%, 3%).                                      |
| <i>hom</i>                     | Between <i>Tp(T54M94)<sup>R</sup></i> , <i>arg-6</i> (1%) and <i>al-1</i> (<1%).                                               |
| <i>hnp</i>                     | Between <i>al-2</i> and <i>nic-1</i> .                                                                                         |
| <i>hsp30</i>                   | Linked to <i>met-3</i> , <i>Cen-1</i> , <i>un-2</i> , <i>his-2</i> (0 T/18 asci).                                              |
| <i>hit</i>                     | Right of <i>ad-3</i> (1%, 10%).                                                                                                |
| <i>In(AR16)<sup>L</sup></i>    | Between <i>ser-3</i> and <i>un-3</i> .                                                                                         |
| <i>In(NM176)<sup>L</sup></i>   | At <i>Tip-IR</i> .                                                                                                             |
| <i>In(NM176)<sup>R</sup></i>   | Between <i>ser-3</i> and <i>un-3</i> .                                                                                         |
| <i>In(OY323)<sup>L</sup></i>   | At <i>Tip-IR</i> .                                                                                                             |
| <i>In(OY323)<sup>R</sup></i>   | Between <i>nir-2</i> and <i>leu-3</i> .                                                                                        |
| <i>In(OY348)<sup>L</sup></i>   | Between <i>lys-3</i> and <i>ace-3</i> , <i>nic-1</i> .                                                                         |
| <i>In(OY348)<sup>R</sup></i>   | Between <i>fr</i> and <i>un-5</i> .                                                                                            |
| <i>In(H4250)<sup>L</sup></i>   | Between <i>ad-9</i> and <i>nir-1</i> .                                                                                         |
| <i>In(H4250)<sup>R</sup></i>   | Between <i>suc</i> and <i>phe-1</i> .                                                                                          |
| <i>ipa</i>                     | At <i>Tip-IR</i> .                                                                                                             |
| <i>krev-1</i>                  | Between <i>mat</i> (20%) and <i>arg-1</i> (1%).                                                                                |
| <i>lah-1</i>                   | Linked to <i>nir-2</i> (0/18).                                                                                                 |
| <i>leu-3</i>                   | Between <i>nir-2</i> (2%) and <i>leu-3</i> (5%).                                                                               |
| <i>leu-4</i>                   | Between <i>lah-1</i> , <i>In(OY323)<sup>L</sup></i> and <i>T(OY322)<sup>L</sup></i> , <i>cyt-1</i> (5%, 8%), <i>T(OY321)</i> . |
| <i>lis-1</i>                   | Between <i>cyt-1</i> , <i>T(OY321)</i> and <i>cys-5</i> (<1%).                                                                 |
| <i>lpl</i>                     | Between <i>ad-3</i> (6%) and <i>al-1</i> (16%).                                                                                |
| <i>lys<sup>R</sup></i>         | Right of <i>his-3</i> , <i>cog</i> (adjoining).                                                                                |
| <i>lys-3</i>                   | Between <i>his-3</i> and <i>nic-2</i> .                                                                                        |
| <i>lys-4</i>                   | Between <i>al-1</i> (9%) and <i>In(OY323)<sup>R</sup></i> , <i>ace-3</i> , <i>nic-1</i> .                                      |
| <i>mad-1</i>                   | Between <i>nuc-1</i> (1%), <i>met-10</i> and <i>his-3</i> (1%).                                                                |
| <i>mat</i>                     | By cosmid assignment.                                                                                                          |
| <i>mb-2</i>                    | Between <i>un-3</i> (≤0.1%) and <i>un-16</i> (<1%). Between <i>eat-5</i> and <i>eat-1</i> .                                    |
| <i>mb-3</i>                    | Between <i>cyh-1</i> (5%) and <i>al-1</i> (7%).                                                                                |
| <i>mea</i>                     | Linked to <i>cyh-1</i> (18%), <i>al-1</i> (2%), <i>mb-2</i> (6%).                                                              |
| <i>mep(3)</i> , <i>mep(10)</i> | Right of <i>acr-3</i> (9%).                                                                                                    |
|                                | Between <i>arg-1</i> (3%) and <i>T(39311)<sup>R</sup></i> .                                                                    |
|                                | Left of <i>mat</i> .                                                                                                           |

## LO. N LINKAGE GROUP 1 (continued)

|                     |                                                                                                                                  |                                |                                                                                          |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------|
| <i>met-6</i>        | Between <i>T(NM103)</i> , <i>T(ALS182)</i> , <i>T(OY343)</i> and <i>ire</i> (7%), <i>ad-9</i> (2%, 16%).                         | <i>sdv-4, sdv-5</i>            | Between <i>al-2</i> (17/18 asci) and <i>arg-13</i> (5T, 2NP/18 asci).                    |
| <i>met-10</i>       | Between <i>his-2</i> , <i>T(AR173)<sup>R</sup></i> , <i>nuc-1</i> and <i>lys-4</i> , <i>his-3</i> .                              | <i>ser-3</i>                   | Between <i>cys-5</i> (<1%) and <i>ln(NM176)<sup>L</sup></i> , <i>un-3</i> (<1%).         |
| <i>mo-1</i>         | Linked to <i>mat</i> (9%).                                                                                                       | <i>sf</i>                      | Linked to <i>mat</i> (3%), <i>cy</i> (3%).                                               |
| <i>mo-5</i>         | Linked to <i>mat</i> (20%).                                                                                                      | <i>slo-1</i>                   | Between <i>mat</i> (14%) and <i>thi-1</i> (2%, 5%).                                      |
| <i>msh-1</i>        | Linked to <i>cyt-21</i> (0/18).                                                                                                  | <i>smco-1</i>                  | Linked to <i>mar</i> (10%), <i>rg-1</i> (0/72).                                          |
| <i>msk-1</i>        | By cosmid assignment.                                                                                                            | <i>smco-3</i>                  | Linked to <i>mar</i> (2%).                                                               |
| <i>mus-9</i>        | Right of <i>al-2</i> (18%).                                                                                                      | <i>smco-5</i>                  | Between <i>Cen-1</i> (<1%) and <i>os-4</i> (<3%), <i>T(AR173)<sup>L</sup></i> .          |
| <i>mus-13</i>       | Between <i>arg-1</i> (4%) and <i>arg-3</i> (<2%).                                                                                | <i>so</i>                      | Between <i>arg-13</i> (2%, 12%) and <i>aro-8</i> (7%, 11%).                              |
| <i>mus-15</i>       | Between <i>aro-8</i> (8%) and <i>un-18</i> (4%).                                                                                 | <i>sod-1</i>                   | Between <i>fr</i> (5T/16 asci) and <i>Fsr-12</i> , <i>vma-4</i> (2 or 4T/18 asci).       |
| <i>mus-19</i>       | Left of <i>cyh-1</i> (2%).                                                                                                       | <i>sor-4</i>                   | Linked to <i>phe-1</i> (<1%) and <i>ln(H4250)<sup>L</sup></i> and <i>arg-1</i> (1%, 4%). |
| <i>mus-22</i>       | Between <i>Cen-1</i> and <i>ad-3B</i> (7%).                                                                                      | <i>spco-11</i>                 | Right of <i>mat</i> (13%, 35%).                                                          |
| <i>mus-31</i>       | Between <i>mus-31</i> (3%) and <i>ad-3B</i> (4%).                                                                                | <i>spco-12</i>                 | Linked to <i>nit-2</i> (<0.2%).                                                          |
| <i>mus-32</i>       | Left of <i>un-5</i> (7%), <i>len-3</i> (10%). Linked to <i>nir-2</i> (0/18).                                                     | <i>ss</i>                      | Linked to <i>mat</i> (22%), <i>Cen-1</i> (7%), <i>al-2</i> (26%).                        |
| <i>mus-38</i>       | Linked to <i>pzl-1</i> (0/18). Between <i>cyt-21</i> (1/18) and <i>fr</i> , <i>nir-2</i> (3/16).                                 | <i>ssu-2</i>                   | Linked to <i>mat</i> (22%), <i>Cen-1</i> (10%), <i>al-2</i> (33%).                       |
| <i>mus-40</i>       | Between <i>cys-9</i> (<2%, 3%) and <i>T(4540)<sup>R</sup></i> , <i>thi-1</i> (<2%, 4%).                                          | <i>ssu-3</i>                   | Linked to <i>al-2</i> (2%, 8%).                                                          |
| <i>nd</i>           | Between <i>lys-3 ace-3</i> (<1%) and <i>T(UK2-26)<sup>R</sup></i> , <i>os-1</i> (10%, 30%).                                      | <i>ssu-8</i>                   | Between <i>ad-3B</i> (5%) and <i>thi-1</i> (14%).                                        |
| <i>nir-1</i>        | Between <i>ad-3B</i> (4%) and <i>tyr-2</i> , <i>T(Y112M4)<sup>R</sup></i> , <i>ace-7</i> (4%, 7%).                               | <i>st</i>                      | Linked to <i>mat</i> (13%).                                                              |
| <i>nir-2</i>        | Between <i>ad-9</i> (3%, 15%), <i>Trp(T54M94)<sup>R</sup></i> and <i>cyh-1</i> (6%).                                             | <i>su(bal)</i>                 | Linked to <i>mat</i> (0/837).                                                            |
| <i>nir-8</i>        | Between <i>un-5</i> (2%), <i>T(39311)<sup>L</sup></i> and <i>lah-1</i> , <i>ln(OY323)<sup>L</sup></i> , <i>len-3</i> (12%, 18%). | <i>su(col-2)</i>               | Linked to <i>al-2</i> (1%).                                                              |
| <i>nuc-1</i>        | Linked to <i>cr-1</i> (0/61). Between <i>nic-2</i> (10%) and <i>thi-1</i> (3%).                                                  | <i>su(met-7)-1</i>             | Between <i>un-7</i> (<1%) and <i>al-2</i> (1%, 4%).                                      |
| <i>nuk-6</i>        | Between <i>his-2</i> (1%), <i>T(AR173)<sup>R</sup></i> and <i>met-10</i> , <i>lys-4</i> (1%).                                    | <i>su(mir)-1</i>               | Right of <i>his-2</i> (2%).                                                              |
| <i>nuk-8</i>        | Between <i>Cen-1</i> (5%) and <i>nic-2</i> (4%).                                                                                 | <i>su(suc)-2</i>               | Linked to <i>suc</i> (3%).                                                               |
| <i>nuc12.3</i>      | Right of <i>nic-1</i> .                                                                                                          | <i>su(trp-3)<sup>102</sup></i> | Linked to <i>al-2</i> (15%).                                                             |
| <i>nuc20.8</i>      | Between <i>lys-4</i> (17/18 asci) and <i>cys-9</i> (7T/18 asci).                                                                 | <i>suc</i>                     | Between <i>acr-3</i> (2%) and <i>ln(H4250)<sup>L</sup></i> , <i>phe-1</i> (1%).          |
| <i>os-1</i>         | Between <i>mat</i> (0 or 1T/17 asci) and <i>Cen-1</i> (3T/17 asci).                                                              | <i>T</i>                       | Between <i>ad-3A</i> (18%), <i>nic-2</i> (12%) and <i>al-2</i> , <i>al-1</i> (12%).      |
| <i>os-4</i>         | Between <i>nic-1</i> (10%, 29%), <i>T(UK2-26)<sup>R</sup></i> and <i>prd-4</i> (2%), <i>arg-13</i> (1%; 4%).                     | <i>T(UK1-35)</i>               | Between <i>cyh-1</i> and <i>al-2</i> .                                                   |
| <i>os-5</i>         | Between <i>sn</i> (3%) and <i>T(AR173)<sup>L</sup></i> .                                                                         | <i>T(MD2)<sup>L</sup></i>      | Between <i>R</i> and <i>het-5</i> .                                                      |
| <i>os-6</i>         | Linked to <i>os-1</i> (4%), <i>os-7</i> (6%).                                                                                    | <i>T(MD2)<sup>R</sup></i>      | Between <i>un-18</i> and <i>Tip-IR</i> .                                                 |
| <i>os-7</i>         | Linked to <i>os-1</i> (11%), <i>os-6</i> (6%).                                                                                   | <i>T(UK2-26)<sup>L</sup></i>   | Between <i>met-6</i> and <i>ad-9</i> .                                                   |
| <i>pa</i>           | Between <i>cr-1</i> (10%) and <i>dir</i> (37%).                                                                                  | <i>T(UK2-26)<sup>R</sup></i>   | Between <i>nic-1</i> and <i>os-1</i> .                                                   |
| <i>pat</i>          | Linked to <i>mat</i> , probably to the right.                                                                                    | <i>T(T39M777)</i>              | At <i>Tip-IR</i> . Linked to <i>R</i> (0/85).                                            |
| <i>pex-2</i>        | Linked to <i>mat</i> . Between <i>cyt-21</i> and <i>met-3</i> .                                                                  | <i>T(STL76)</i>                | Between <i>cyh-1</i> and <i>os-5</i> .                                                   |
| <i>phe-1</i>        | Between <i>suc</i> (<1%), <i>ln(H4250)<sup>L</sup></i> and <i>ad-5</i> .                                                         | <i>T(288)</i>                  | At <i>Tip-IR</i> . Linked to <i>un-18</i> (0/50).                                        |
| <i>phr</i>          | Linked to <i>con-8</i> (0/18). Right of <i>os-1</i> (15%).                                                                       | <i>T(NM103)</i>                | Between <i>thi-1</i> and <i>met-6</i> .                                                  |
| <i>prd-3</i>        | Near <i>Cen-1</i> .                                                                                                              | <i>T(Y112M4)<sup>L</sup></i>   | Breakpoint at <i>ad-3A</i> .                                                             |
| <i>prd-4</i>        | Between <i>os-1</i> (2%) and <i>arg-13</i> (3%).                                                                                 | <i>T(Y112M4)<sup>R</sup></i>   | Between <i>tyr-2</i> and <i>ace-7</i> .                                                  |
| <i>pzl-1</i>        | Linked to <i>mus-40</i> (0/18). Between <i>cyt-21</i> (1/18) and <i>nir-2</i> (3/16).                                            | <i>T(NM169d)</i>               | Between <i>het-5</i> and <i>un-18</i> .                                                  |
| <i>R</i>            | Between <i>aro-8</i> (4%) and <i>T(MD2)<sup>L</sup></i> , <i>un-18</i> (11%).                                                    | <i>T(NM173)<sup>L</sup></i>    | Between <i>sn</i> , <i>os-4</i> and <i>un-2</i> .                                        |
| <i>rec-3</i>        | Between <i>acr-3</i> (1 or 2%) and <i>arg-3</i> (2%, 6%).                                                                        | <i>T(NM173)<sup>R</sup></i>    | Between <i>his-2</i> and <i>nuc-1</i> .                                                  |
| <i>rg-1</i>         | Between <i>his-2</i> , <i>T(AR173)<sup>R</sup></i> and <i>lys-4</i> (1%; 7%).                                                    | <i>T(ALS182)</i>               | Between <i>thi-1</i> and <i>met-6</i> .                                                  |
| <i>rg-2</i>         | Linked to <i>rg-1</i> (0/650). Left of <i>lys-4</i> (12%).                                                                       | <i>T(ALS190)</i>               | Between <i>un-2</i> and <i>his-2</i> .                                                   |
| <i>rgb-1</i>        | Linked to <i>len-4</i> , <i>mat</i> , <i>arg-3</i> (0/18).                                                                       | <i>T(AR217)<sup>L</sup></i>    | Between <i>thi-1</i> , <i>cr-3</i> and <i>met-6</i> .                                    |
| <i>ro-6</i>         | Between <i>T(4540)<sup>R</sup></i> , <i>nic-2</i> (0/95) and <i>T(4540)<sup>R</sup></i> , <i>thi-1</i> .                         | <i>T(AR217)<sup>R</sup></i>    | Between <i>nic-1</i> and <i>os-1</i> .                                                   |
| <i>ro-10</i>        | Between <i>Tip-IL</i> and <i>cyt-21</i> (1%), <i>fr</i> (18%).                                                                   | <i>T(OY321)</i>                | Between <i>cyt-1</i> and <i>len-4</i> .                                                  |
| <i>sar-1, sar-3</i> | Near <i>mat</i> .                                                                                                                | <i>T(OY322)<sup>L</sup></i>    | Between <i>len-3</i> and <i>cyt-1</i> .                                                  |
| <i>scp</i>          | Linked to <i>Fsr-18</i> .                                                                                                        | <i>T(OY322)<sup>R</sup></i>    | Between <i>un-16</i> and <i>suc</i> .                                                    |
| <i>sdh-1</i>        | Linked to <i>mat</i> (0/13).                                                                                                     | <i>T(OY330)<sup>L</sup></i>    | Between <i>fr</i> and <i>un-5</i> .                                                      |

## LOCI IN LINKAGE GROUP I (continued)

|                                  |                                                                                                                      |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <i>T(OY330)<sup>R</sup></i>      | Between <i>un-16</i> and <i>suc</i> .                                                                                |
| <i>T(OY343)</i>                  | Between <i>thi-1</i> and <i>met-6</i> .                                                                              |
| <i>T(OY350)</i>                  | At <i>Tip-IR</i> . Linked to <i>un-18</i> (2/44).                                                                    |
| <i>T(4540)<sup>L</sup> nic-2</i> | Breakpoint at <i>nic-2</i> .                                                                                         |
| <i>T(4540)<sup>R</sup></i>       | Between <i>un-1</i> , <i>cys-9</i> and <i>thi-1</i> .                                                                |
| <i>T(5936)</i>                   | At <i>Tip-IL</i> .                                                                                                   |
| <i>T(P7442)<sup>L</sup></i>      | Between <i>ad-3B</i> and <i>nic-2</i> .                                                                              |
| <i>T(P7442)<sup>R</sup></i>      | Between <i>cys-9</i> and <i>thi-1</i> .                                                                              |
| <i>T(39311)<sup>L</sup></i>      | Between <i>un-5</i> and <i>nlt-2</i> .                                                                               |
| <i>T(39311)<sup>R</sup></i>      | Between <i>arg-3</i> , <i>csp-1</i> and <i>Cen-I</i> .                                                               |
| <i>ta</i>                        | Between <i>un-16</i> (2%) and <i>acr-3</i> (<3%).                                                                    |
| <i>tef-1</i>                     | Linked to <i>leu-4</i> , <i>mat</i> , <i>arg-3</i> (0/18).                                                           |
| <i>TeI-IR</i>                    | Linked to <i>arg-13</i> (6T, 2NPD/18 asci).                                                                          |
| <i>tet</i>                       | Linked to <i>acr-3</i> (2%), <i>ad-3B</i> (1%).                                                                      |
| <i>thi-1</i>                     | Between <i>cys-9</i> (13%), <i>T(4540)<sup>R</sup></i> and <i>T(NM103)</i> , <i>met-6</i> (7%; 14%).                 |
| <i>tl</i>                        | Between <i>arg-3</i> and <i>T(39311)<sup>R</sup></i> .                                                               |
| <i>Tip-IL</i>                    | Marked by <i>T(5936)</i> . Left of <i>ro-10</i> , <i>fr</i> .                                                        |
| <i>Tip-IR</i>                    | Marked by <i>In(H4250)</i> and other rearrangements. Right of <i>R</i> , <i>un-18</i> .                              |
| <i>Tp(T54M94)<sup>L</sup></i>    | Between <i>arg-3</i> (2%) and <i>Cen-I</i> .                                                                         |
| <i>Tp(T54M94)<sup>M</sup></i>    | Between <i>ad-9</i> and <i>nlt-1</i> .                                                                               |
| <i>Tp(T54M94)<sup>R</sup></i>    | Between <i>al-2</i> and <i>arg-6</i> .                                                                               |
| <i>ire-1</i>                     | Between <i>met-6</i> (7%) and <i>ad-9</i> (10%).                                                                     |
| <i>ty-2</i>                      | Right of <i>al-2</i> .                                                                                               |
| <i>tyr-2</i>                     | Between <i>T(4540)<sup>L</sup> nic-2</i> and <i>T(Y112M41)<sup>R</sup></i> , <i>ace-7</i> , <i>cr-1</i> (2%).        |
| <i>lys</i>                       | Right of <i>mat</i> (6%).                                                                                            |
| <i>uc-2</i>                      | Linked to <i>mat</i> (0/12 asci), <i>upr-1</i> . Between <i>mat</i> (2%) and <i>arg-1</i> (7%).                      |
| <i>un-1</i>                      | Between <i>cr-1</i> (5%; 9%) and <i>nd</i> , <i>T(4540)<sup>R</sup></i> . Linked to <i>cys-9</i> (0/72).             |
| <i>un-2</i>                      | Between <i>sn</i> , <i>os-4</i> , <i>T(AR173)<sup>L</sup></i> and <i>nd</i> , <i>T(AR190)</i> , <i>his-2</i> (1%).   |
| <i>un-3</i>                      | Between <i>ser-3</i> (1%), <i>In(NM176)<sup>L</sup></i> and <i>mat</i> (≤0.1%).                                      |
| <i>un-5</i>                      | Between <i>fr</i> (6%), <i>T(OY330)<sup>L</sup></i> and <i>T(39311)<sup>L</sup></i> , <i>nlt-2</i> (2%).             |
| <i>un-7</i>                      | Between <i>cyh-1</i> , <i>T(STL76)</i> and <i>al-1</i> (3%).                                                         |
| <i>un-16</i>                     | Between <i>mat</i> (<1%) and <i>ta</i> (1%), <i>acr-3</i> (<3%).                                                     |
| <i>un-18</i>                     | Between <i>R</i> (11%), <i>T(MD2)<sup>L</sup></i> , <i>T(NM169d)</i> and <i>T(MD2)<sup>R</sup></i> , <i>Tip-IR</i> . |
| <i>upr-1</i>                     | Between <i>mat</i> (2%) and <i>arg-1</i> (7%).                                                                       |
| <i>ure-4</i>                     | Linked to <i>his-3</i> (1%), probably to the right. Left of <i>ad3B</i> (3%).                                        |
| <i>uvs-6</i>                     | Linked to <i>met-6</i> (<1%).                                                                                        |
| <i>vma-4</i>                     | Linked to <i>Fgr-12</i> (0T/18 asci). Left of <i>mat</i> (4T/18 asci).                                               |
| <i>vma-11</i>                    | Between <i>al-2</i> (1T/18 asci) and <i>arg-13</i> (5T, 2 NPD/18 asci).                                              |
| <i>wc-2</i>                      | Between <i>thi-1</i> (8%), <i>T(ALS182)</i> and <i>ad-9</i> (7%; 20%).                                               |
| <i>ylo-2</i>                     | Between <i>suc</i> , <i>In(H4250)<sup>L</sup></i> and <i>arg-1</i> (1%).                                             |
| <i>zip-1</i>                     | Linked to <i>cyt-21</i> (0T/18 asci).                                                                                |
| <i>znr-3</i>                     | Linked to <i>mat</i> .                                                                                               |



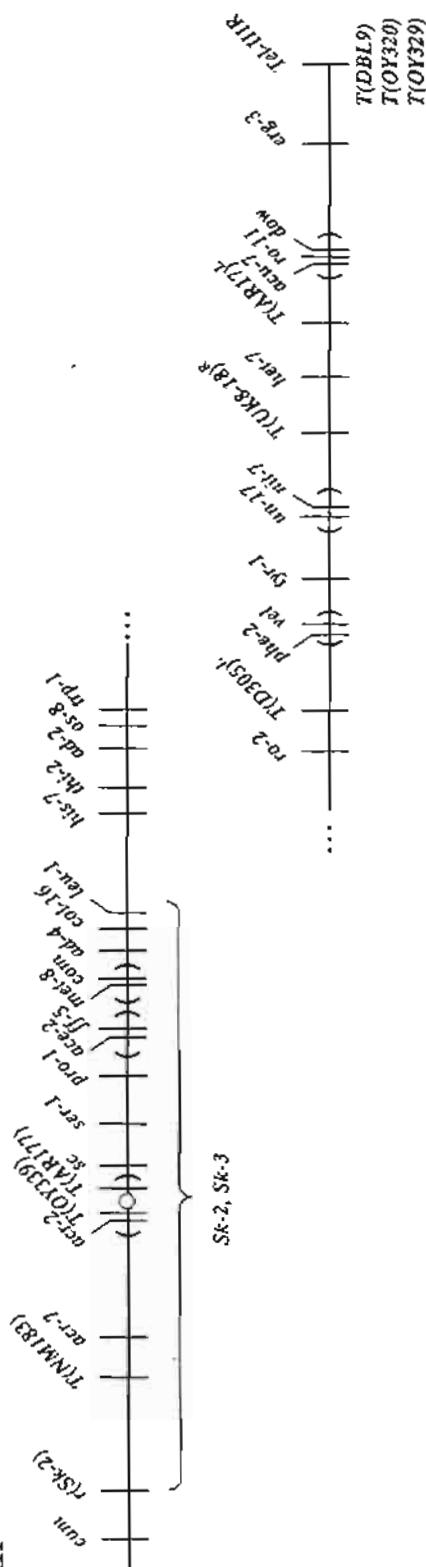


LOC<sup>+</sup> IN LINKAGE GROUP II (continued)

|                              |                                                                                                                  |                |                                                                                                       |
|------------------------------|------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------|
| <i>hsp70</i>                 | Between <i>T(AR18)</i> <sup>L</sup> and <i>un-24</i> .                                                           | <i>Tel-11R</i> | Right of <i>leu-6</i> (1T, INPD/18 asci).                                                             |
| <i>leu-6</i>                 | Between <i>irp-3</i> (2/16), <i>Fsr-17</i> (5T/18 asci), and <i>Tel-11R</i> (1T, INPD/16 asci).                  | <i>Tip-11L</i> | Left of <i>T(AR30)</i> , <i>pi</i> (≥28%).                                                            |
| <i>ip</i>                    | Right of <i>thr-3</i> (10%).                                                                                     | <i>Tip-11R</i> | Right of <i>un-15</i> , <i>rip-1</i> .                                                                |
| <i>mcm</i>                   | Linked to <i>ro-7</i> (1%).                                                                                      | <i>thr-2</i>   | Between <i>ro-3</i> , <i>T(NM149)</i> and <i>T(AR179)</i> , <i>bal</i> , <i>arg-5</i> (3%; 18%).      |
| <i>mus-7</i>                 | Between <i>arg-5</i> (8%; 12%) and <i>nuc-2</i> (11%).                                                           | <i>thr-3</i>   | Linked to <i>thr-2</i> (<0.1%).                                                                       |
| <i>mus-23</i>                | Between <i>fl</i> (<1%; 2%) and <i>irp-3</i> (9%).                                                               | <i>ing</i>     | Between <i>pyr-4</i> (16%), <i>T(NM149)</i> and <i>arg-5</i> (6%, 14%). Linked to <i>thr-2</i> (2%).  |
| <i>mus-24</i>                | Left of <i>pyr-4</i> (8%).                                                                                       | <i>irp-3</i>   | Between <i>fl</i> (2%, 6%), <i>mus-23</i> (6%) and <i>un-15</i> (10%).                                |
| <i>mus-27</i>                | Right of <i>nuc-2</i> (16%).                                                                                     | <i>tic</i>     | Between <i>pe</i> (8%) and <i>fl</i> (19%).                                                           |
| <i>nik-2</i>                 | Linked to <i>arg-12</i> (0/17).                                                                                  | <i>uc-1</i>    | Linked to <i>pyr-4</i> (31%).                                                                         |
| <i>nrc-2</i>                 | Linked to <i>cya-4</i> , <i>Fsr-55</i> .                                                                         | <i>un-15</i>   | Between <i>irp-3</i> (10%) and <i>rip-1</i> (1%).                                                     |
| <i>nuc-2</i>                 | Between <i>aro-3</i> , <i>T(NM177)</i> <sup>L</sup> and <i>preg</i> (1 or 2%), <i>pe</i> (4%).                   | <i>un-20</i>   | Between <i>aro-1</i> (5%; 9%), <i>fl-1</i> (4%) and <i>ace-1</i> (15%).                               |
| <i>nuc-3</i>                 | Right of <i>arg-12</i> (4%). ( <i>nuc-4</i> – <i>nuc-7</i> )                                                     | <i>un-24</i>   | Between <i>T(AR18)</i> <sup>L</sup> , <i>hsp70</i> and <i>het-6</i> , <i>T(AR18)</i> <sup>R</sup> .   |
| <i>nuc-5</i>                 | Linked to <i>trp-3</i> (30%), <i>T(4637)</i> .                                                                   | <i>ure-3</i>   | Between <i>arg-12</i> (7%; 12%) and <i>un-20</i> (8%).                                                |
| <i>nuc-9</i>                 | Linked to <i>arg-5</i> . Left of <i>mus-7</i> , <i>nuc-2</i> .                                                   | <i>vma-2</i>   | Between <i>preg</i> (6T/18 asci) and <i>Fsr-3</i> (1T/18 asci), <i>eas</i> (2T/18 asci).              |
| <i>nuc78</i>                 | Linked to <i>preg</i> (0T/5 asci).                                                                               | <i>vma-6</i>   | Near <i>Cen-11</i> . In same cDNA fragment with <i>rap-1</i> .                                        |
| <i>osr-2</i>                 | Linked to <i>arg-5</i> (≤12%).                                                                                   | <i>vma-10</i>  | Linked near <i>arg-12</i> .                                                                           |
| <i>Pad-1</i>                 | Between <i>het-c</i> and <i>pyr-4</i> (1%).                                                                      | <i>vph-1</i>   | Left of <i>Cen-11</i> (5T/18 asci), <i>Fsr-32</i> (4T/18 asci). Linked to <i>Fsr-32</i> (0T/18 asci). |
| <i>pe</i>                    | Between <i>nuc-2</i> (4%) and <i>arg-12</i> (1%, 5%).                                                            | <i>xch-1</i>   | Linked to <i>pe</i> (14%).                                                                            |
| <i>pi</i>                    | Linked to <i>ro-7</i> (0/75). Between <i>T(AR30)</i> (28%) and <i>cys-3</i> (4%).                                | <i>ypt-1</i>   | Linked to <i>eas</i> (0T/17 asci).                                                                    |
| <i>pma-1</i>                 | Between <i>cya-4</i> (2T/18 asci) and <i>preg</i> (1T/15 asci).                                                  |                |                                                                                                       |
| <i>pmg</i>                   | Linked to <i>pyr-4</i> (<1%).                                                                                    |                |                                                                                                       |
| <i>prd-5</i>                 | Between <i>arg-12</i> (4%; 10%) and <i>un-20</i> (8%).                                                           |                |                                                                                                       |
| <i>preg</i>                  | Between <i>T(NM177)</i> <sup>L</sup> , <i>nuc-2</i> (1 or 2%) and <i>arg-12</i> , <i>T(NM177)</i> <sup>R</sup> . |                |                                                                                                       |
| <i>pyr-4</i>                 | Between <i>het-c</i> (1%), <i>Pad-1</i> (1%) and <i>ro-3</i> (1 or 2%).                                          |                |                                                                                                       |
| <i>rap-1</i>                 | Adjacent to <i>vma-6</i> . Near <i>Cen-11</i> .                                                                  |                |                                                                                                       |
| <i>rip-1</i>                 | Between <i>un-15</i> (1%) and <i>Tip-11R</i> .                                                                   |                |                                                                                                       |
| <i>ro-3</i>                  | Between <i>pyr-4</i> (1 or 2%) and <i>T(NM149)</i> , <i>thr-2</i> (6%, 25%).                                     |                |                                                                                                       |
| <i>ro-7</i>                  | Linked to <i>pi</i> (0/75). Left of <i>cys-3</i> (11%).                                                          |                |                                                                                                       |
| <i>scr</i>                   | Linked to <i>arg-12</i> (2%), probably to the left.                                                              |                |                                                                                                       |
| <i>spco-14</i>               | Linked to <i>arg-5</i> (7%).                                                                                     |                |                                                                                                       |
| <i>su(mil-1)-3</i>           | Linked to <i>fl</i> (31%).                                                                                       |                |                                                                                                       |
| <i>su(mil-1)-4</i>           | Linked to <i>fl</i> (22%), <i>arg-5</i> (40%).                                                                   |                |                                                                                                       |
| <i>su(mil-1)-10</i>          | Linked to <i>arg-5</i> (29%), <i>fl</i> (24%).                                                                   |                |                                                                                                       |
| <i>T(UK4-22)</i>             | Linked to <i>pe</i> (0/46) and <i>arg-12</i> , <i>aro-1</i> (0/23).                                              |                |                                                                                                       |
| <i>T(AR18)</i> <sup>L</sup>  | Between <i>ro-7</i> , <i>cys-3</i> and <i>hsp70</i> .                                                            |                |                                                                                                       |
| <i>T(AR18)</i> <sup>R</sup>  | Between <i>het-6</i> and <i>col-5</i> . Within 5.6 kb of <i>T(P2869)</i> .                                       |                |                                                                                                       |
| <i>T(AR30)</i>               | Between <i>Tip-11L</i> and <i>pi</i> (28%).                                                                      |                |                                                                                                       |
| <i>T(NM149)</i>              | Between <i>ro-3</i> and <i>thr-2</i> , <i>thr-3</i> .                                                            |                |                                                                                                       |
| <i>T(ALS176)</i>             | Between <i>Cen-11</i> and <i>arg-5</i> .                                                                         |                |                                                                                                       |
| <i>T(NM177)</i> <sup>L</sup> | Between <i>aro-3</i> , <i>cpi</i> and <i>nuc-2</i> .                                                             |                |                                                                                                       |
| <i>T(NM177)</i> <sup>R</sup> | Between <i>arg-12</i> and <i>aro-1</i> .                                                                         |                |                                                                                                       |
| <i>T(OY337)</i>              | Between <i>pe</i> and <i>arg-12</i> .                                                                            |                |                                                                                                       |
| <i>T(P2869)</i> <sup>L</sup> | Between <i>Tip-11L</i> and <i>ro-7</i> .                                                                         |                |                                                                                                       |
| <i>T(P2869)</i> <sup>R</sup> | Between <i>het-6</i> and <i>col-5</i> . Within 5.6 kb of <i>T(AR18)</i> <sup>R</sup> .                           |                |                                                                                                       |
| <i>Tel-11L</i>               | Linked to <i>hsp70</i> (2T/18 asci).                                                                             |                |                                                                                                       |



## III

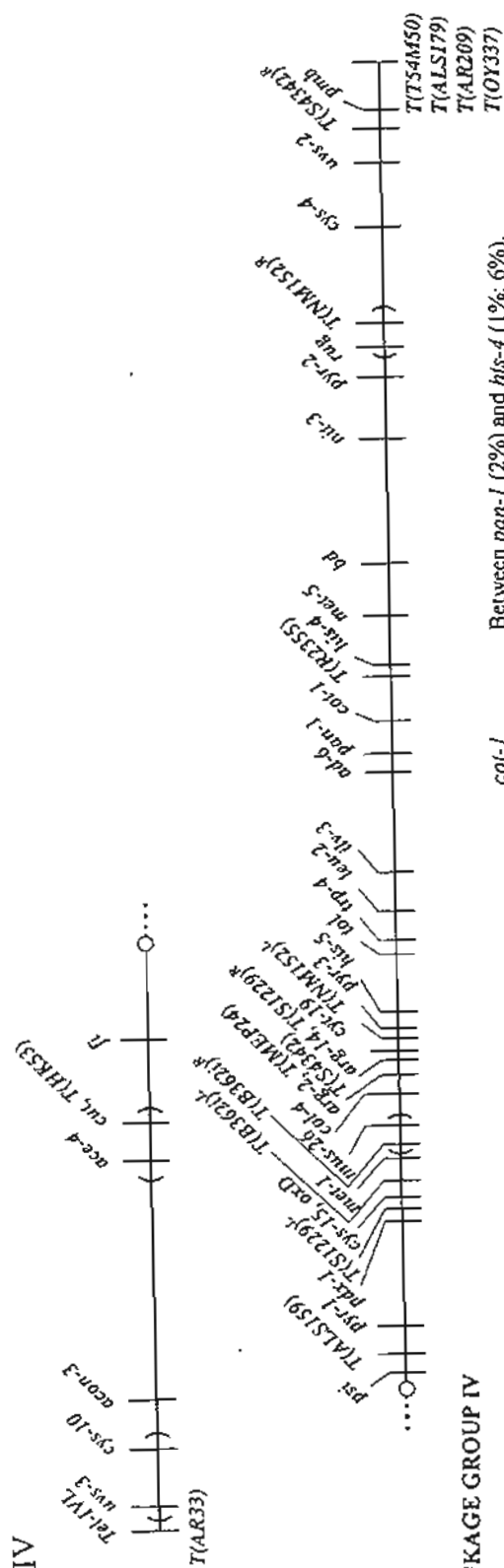


## LOCI IN LINKAGE GROUP III

|                |                                                                                                                    |                |                                                                                                                  |
|----------------|--------------------------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------|
| <i>aab-1</i>   | Linked to <i>trp-1</i> .                                                                                           | <i>dim-1</i>   | Linked to <i>mus-20</i> , <i>trp-1</i> .                                                                         |
| <i>ace-2</i>   | Between <i>pro-1</i> (1%, 9%; 36kb) and <i>com</i> (5%), <i>ad-4</i> (4%; 7%).                                     | <i>Dip-1</i>   | Between <i>ro-2</i> (7%) and <i>phe-2</i> (1%).                                                                  |
| <i>acon-2</i>  | Linked to <i>vel</i> (6%), <i>trp-1</i> (9%; 14%).                                                                 | <i>dow</i>     | Between <i>un-17</i> (23%), <i>T(ARI7)<sup>L</sup></i> and <i>T(ARI7)<sup>R</sup></i> , <i>erg-3</i> (10%, 14%). |
| <i>acr-2</i>   | Linked to <i>Cen-III</i> . Between <i>acr-7</i> and <i>T(T54M140b)</i> , <i>thi-4</i> (0/286), <i>sc</i> (3%, 6%). | <i>erg-3</i>   | Between <i>pro-1</i> (2%) and <i>met-8</i> (1%).                                                                 |
| <i>acr-6</i>   | Linked to <i>shg</i> (<1%).                                                                                        | <i>ff-5</i>    | Near <i>ty-1</i> .                                                                                               |
| <i>acr-7</i>   | Between <i>r(Sk-2)-1</i> (7%), <i>T(NM183)</i> (5%) and <i>acr-2</i> (12%), <i>Cen-III</i> .                       | <i>ff-6</i>    | Linked to <i>trp-1</i> (<1%), <i>thi-2</i> (5%).                                                                 |
| <i>acu-7</i>   | Linked to <i>dow</i> (0/72).                                                                                       | <i>fpr-3</i>   | Between <i>ro-2</i> (3/18) and <i>cat-3</i> (2T, INPD/18 asc), <i>Tel-III</i> (3T, INPD/18 asc).                 |
| <i>ad-2</i>    | Between <i>thi-2</i> (1%) and <i>trp-1</i> (1%; 7%).                                                               | <i>Fsr-45</i>  | asci).                                                                                                           |
| <i>ad-4</i>    | Between <i>met-8</i> (1%; 4%), <i>com</i> (0; 5%) and <i>col-16</i> , <i>leu-1</i> (1%; 3%).                       | <i>gluc-1</i>  | Linked to <i>dow</i> (10%).                                                                                      |
| <i>aza-3</i>   | Linked to <i>trp-1</i> (14%).                                                                                      | <i>gna-1</i>   | Linked to <i>ro-2</i> (0/17).                                                                                    |
| <i>cat-1</i>   | Left of <i>trp-1</i> (17%).                                                                                        | <i>gnb-1</i>   | Linked to <i>trp-1</i> (0/18).                                                                                   |
| <i>cat-3</i>   | Linked to <i>Fsr-45</i> (2T/18 asc), <i>Tel-III</i> (5T/18 asc).                                                   | <i>het-7</i>   | Between <i>T(D305)<sup>L</sup></i> , <i>T(UK8-18)<sup>R</sup></i> and <i>T(ARI7)<sup>L</sup></i> .               |
| <i>Cen-III</i> | Between <i>acr-7</i> and <i>thi-4</i> (1T/18 asc), <i>sc</i> (2T/24 asc).                                          | <i>hH4-2</i>   | Linked to <i>trp-1</i> (0/18).                                                                                   |
| <i>col-16</i>  | Between <i>pro-1</i> (10%), <i>ad-4</i> and <i>leu-1</i> (1%).                                                     | <i>his-7</i>   | Between <i>leu-1</i> (8%; 20%) and <i>thi-2</i> (1 or 2%).                                                       |
| <i>com</i>     | Between <i>ace-2</i> (5%) and <i>ad-4</i> (<1%; 5%).                                                               | <i>lao</i>     | Linked to <i>un-17</i> (5%).                                                                                     |
| <i>con-1</i>   | Left of <i>Cen-III</i> (6T/18 asc).                                                                                | <i>leu-1</i>   | Linked to <i>leu-1</i> (12%), probably to the left.                                                              |
| <i>con-7</i>   | Between <i>ace-2</i> (4T/18 asc), <i>cyi-8</i> (3T/18 asc) and <i>ad-2</i> , <i>trp-1</i> (0/17, 1T/18 asc).       | <i>mei-4</i>   | Linked to <i>leu-1</i> (17%).                                                                                    |
| <i>cor-1</i>   | Linked to <i>dow</i> (1%), probably to the right.                                                                  | <i>mel-3</i>   | Between <i>ace-2</i> , <i>ff-5</i> (1%; 4%), and <i>ad-4</i> (4%).                                               |
| <i>cox-4</i>   | Linked to <i>acr-2</i> (1 or 2/15).                                                                                | <i>met-8</i>   | By cosmid assignment to chromosomal DNA. Tentative.                                                              |
| <i>cpk</i>     | Linked to <i>un-17</i> (5%).                                                                                       | <i>mgk-1</i>   | Linked to <i>trp-1</i> (1T/18 asc).                                                                              |
| <i>cr-5</i>    | Linked to <i>ad-4</i> (19%).                                                                                       | <i>mip-1</i>   | Right of <i>leu-1</i> (8%).                                                                                      |
| <i>crp-2</i>   | Linked to <i>Cen-III</i> (0T/18 asc).                                                                              | <i>mo-4</i>    | Between <i>leu-1</i> and <i>his-7</i> .                                                                          |
| <i>cum</i>     | Between <i>Tip-III</i> and <i>r(Sk-2)-1</i> (4%), <i>acr-7</i> (5%, 18%).                                          | <i>mod(pr)</i> | Between <i>trp-1</i> (8%) and <i>phe-2</i> (18%).                                                                |
| <i>cyi-8</i>   | Near <i>ad-4</i> . Between <i>ace-2</i> (1 or 2T/18 asc) and <i>ad-2</i> (4T/18 asc), <i>trp-1</i> (3/18).         | <i>mus-20</i>  | Linked to <i>trp-1</i> (20%). Right of <i>ad-2</i> .                                                             |
| <i>cyi-22</i>  | Linked to <i>r(Sk-2)-1</i> (30%), <i>cum</i> (6%, 30%), <i>acr-7</i> (19%). Left of <i>cyi-8</i> (4/18).           | <i>mus-21</i>  | Left of <i>ad-2</i> (5%), <i>trp-1</i> (8%).                                                                     |
|                |                                                                                                                    | <i>mt-7</i>    | Linked to <i>un-17</i> (0/63).                                                                                   |
|                |                                                                                                                    | <i>nuh-1</i>   | Between <i>leu-1</i> (4%) and <i>nuh-2</i> (<1%), <i>trp-1</i> (11%).                                            |

# LOCUS LINKAGE GROUP III (continued)

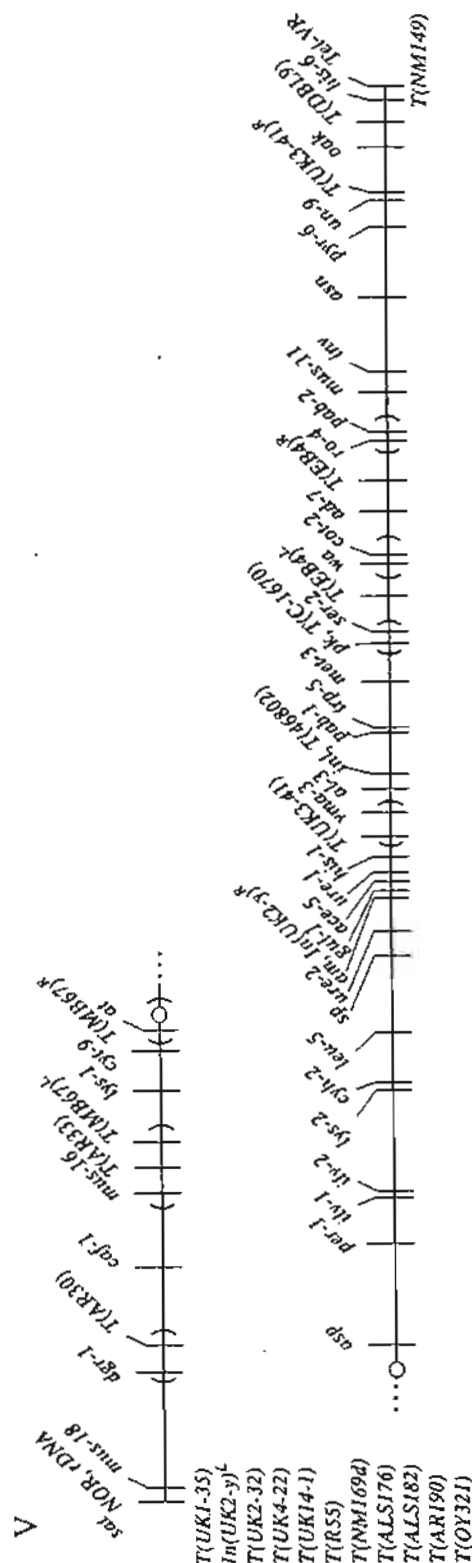
|                               |                                                                                                                          |                |                                                                                     |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|
| <i>nul-2</i>                  | Between <i>leu-1</i> (4%), <i>nul-1</i> (<1%) and <i>trp-1</i> (11%).                                                    | <i>Tip-III</i> | Left of <i>r(Sk-2)</i> , <i>cum</i> , <i>acr-7</i> .                                |
| <i>os-8</i>                   | Between <i>ad-2</i> and <i>trp-1</i> .                                                                                   | <i>Tip-III</i> | Marked by <i>T(OY320)</i> . Right of <i>dow</i> , <i>erg-3</i> .                    |
| <i>os-11</i>                  | Linked to <i>os-8</i> (19%).                                                                                             | <i>trk</i>     | Linked to <i>leu-1</i> (0/92).                                                      |
| <i>ota</i>                    | Between <i>ad-4</i> (15%) and <i>tyr-1</i> (14%). Linked to <i>pro-4</i> (4%).                                           | <i>trp-1</i>   | Between <i>ad-2</i> (1%; 7%) and <i>ro-2</i> (2%; 12%).                             |
| <i>pgo</i>                    | Linked to <i>tyr-1</i> (1%; 4%), probably to the right.                                                                  | <i>trx</i>     | Adjoins <i>acr-2</i> .                                                              |
| <i>phe-2</i>                  | Linked to <i>vel</i> (1%). Between <i>T(D305)<sup>L</sup></i> and <i>tyr-1</i> (2%; 4%).                                 | <i>tyr-1</i>   | Linked to <i>tyr-1</i> (0%; 6%).                                                    |
| <i>pr(Sk-2)</i>               | Between <i>Cen-III</i> , <i>ser-1</i> and <i>ad-4</i> , <i>leu-1</i> , <i>mod(pr)</i> .                                  | <i>tyr-3</i>   | Between <i>Cen-III</i> and <i>ad-4</i> .                                            |
| <i>prd-1</i>                  | Linked to <i>acr-2</i> (5%), <i>Cen-III</i> (0/35 asci), <i>pro-1</i> (20%).                                             | <i>tyr-1</i>   | Between <i>vel</i> (3%; 5%), <i>phe-2</i> (2%; 4%) and <i>un-17</i> (4%).           |
| <i>pro-1</i>                  | Between <i>ser-1</i> (1%; 114 kb) and <i>ace-2</i> (2%; 36kb).                                                           | <i>un-6</i>    | Between <i>sc</i> (21%) and <i>leu-1</i> .                                          |
| <i>pro-4</i>                  | Linked to <i>thi-2</i> (0/78), <i>ota</i> (4%).                                                                          | <i>un-14</i>   | Between <i>acr-2</i> , <i>thi-4</i> (8%; 20%) and <i>met-8</i> , <i>leu-1</i> (5%). |
| <i>r(Sk-2)</i>                | Between <i>cum</i> (2%) and <i>T(NM183)</i> (2%), <i>acr-7</i> (7%).                                                     | <i>un-17</i>   | Between <i>acr-2</i> and <i>met-8</i> , <i>leu-1</i> .                              |
| <i>r(Sk-3)</i>                | Between <i>cum</i> (4%) and <i>acr-7</i> (17%).                                                                          | <i>un-21</i>   | Left of <i>ad-4</i> (4%).                                                           |
| <i>ro-1</i>                   | Linked to <i>acr-2</i> (7%; 17%).                                                                                        | <i>uvs-4</i>   | Linked to <i>vel</i> (1%).                                                          |
| <i>ro-2</i>                   | Between <i>trp-1</i> (2%; 14%) and <i>T(D305)<sup>L</sup></i> , <i>phe-2</i> (5%).                                       | <i>uvs-5</i>   | Linked to <i>phe-2</i> (1%).                                                        |
| <i>ro-11</i>                  | Linked to <i>dow</i> (0/70). Between <i>T(ARI7)<sup>L</sup></i> and <i>T(ARI7)<sup>R</sup></i> .                         | <i>vel</i>     | Linked to <i>phe-2</i> (1%).                                                        |
| <i>sc</i>                     | Between <i>acr-2</i> (3%; 6%), <i>Cen-III</i> (4T/230) and <i>ser-1</i> (4%). Linked to <i>thi-4</i> , <i>spg</i> (<1%). |                |                                                                                     |
| <i>scon-2</i>                 | Between <i>trp-1</i> and <i>Fsr-45</i> . Linked to <i>tyr-1</i> (18%).                                                   |                |                                                                                     |
| <i>ser-1</i>                  | Between <i>sc</i> (4%) and <i>pro-1</i> (1%; 9%; 114 kb).                                                                |                |                                                                                     |
| <i>ser-5</i>                  | Linked to <i>trp-1</i> (1%), <i>ser-1</i> (12%).                                                                         |                |                                                                                     |
| <i>shg</i>                    | Linked to <i>trp-1</i> (7%), <i>acr-6</i> (0/368).                                                                       |                |                                                                                     |
| <i>Sk-2</i>                   | A haplotype, <i>r(Sk-2)</i> through <i>leu-1</i> . Between <i>cum</i> (2%) and <i>his-7</i> (21%).                       |                |                                                                                     |
| <i>Sk-3</i>                   | A haplotype, <i>r(Sk-3)</i> through <i>leu-1</i> . Between <i>cum</i> (2%) and <i>his-7</i> (12%).                       |                |                                                                                     |
| <i>sor-3</i>                  | Linked to <i>ad-4</i> (7%).                                                                                              |                |                                                                                     |
| <i>spco-15</i>                | Linked to <i>spg</i> (10%), <i>Cen-III</i> (0T/10 asci).                                                                 |                |                                                                                     |
| <i>spg</i>                    | Linked to <i>sc</i> , <i>thi-4</i> (<1%). Between <i>acr-2</i> (1%; 11%) and <i>ser-1</i> (8%).                          |                |                                                                                     |
| <i>su(mit-1)-1</i>            | Linked to <i>ad-4</i> (14%).                                                                                             |                |                                                                                     |
| <i>su(trp-3)<sup>ad</sup></i> | Linked to <i>leu-1</i> (22%).                                                                                            |                |                                                                                     |
| <i>T(UK8-18)<sup>L</sup></i>  | Between <i>his-7</i> and <i>trp-1</i> .                                                                                  |                |                                                                                     |
| <i>T(UK8-18)<sup>R</sup></i>  | Between <i>mit-7</i> <i>un-17</i> and <i>het-7</i> .                                                                     |                |                                                                                     |
| <i>T(DBL9)</i>                | At <i>Tip-III</i> . Linked to <i>dow</i> (2/28).                                                                         |                |                                                                                     |
| <i>T(ARI7)<sup>L</sup></i>    | Between <i>tyr-1</i> <i>het-7</i> and <i>dow</i> .                                                                       |                |                                                                                     |
| <i>T(ARI7)<sup>R</sup></i>    | Between <i>dow</i> and <i>erg-3</i> .                                                                                    |                |                                                                                     |
| <i>T(TS4M140b)</i>            | Between <i>acr-2</i> and <i>thi-4</i> , <i>spg</i> (0/34).                                                               |                |                                                                                     |
| <i>T(ARI77)</i>               | Near <i>Cen-III</i> , probably to the right.                                                                             |                |                                                                                     |
| <i>T(NM183)</i>               | Between <i>r(Sk-2)-1</i> (2%) and <i>acr-7</i> (5%).                                                                     |                |                                                                                     |
| <i>T(D305)<sup>L</sup></i>    | Between <i>ro-2</i> and <i>phe-2</i> .                                                                                   |                |                                                                                     |
| <i>T(D305)<sup>R</sup></i>    | Right of <i>dow</i> .                                                                                                    |                |                                                                                     |
| <i>T(OY320)</i>               | At <i>Tip-III</i> . Linked to <i>dow</i> (3/30).                                                                         |                |                                                                                     |
| <i>T(OY329)</i>               | At <i>Tip-III</i> . Linked to <i>trp-1</i> (4/42).                                                                       |                |                                                                                     |
| <i>T(OY339)</i>               | Near <i>Cen-III</i> , probably to the left.                                                                              |                |                                                                                     |
| <i>Tel-III</i>                | Linked to <i>cat-3</i> (5T/18 asci).                                                                                     |                |                                                                                     |
| <i>thi-2</i>                  | Between <i>his-7</i> (1 or 2%) and <i>ad-2</i> (1%; 3%).                                                                 |                |                                                                                     |
| <i>thi-4</i>                  | Between <i>Cen-III</i> (1T/18 asci) and <i>pro-1</i> (3%; 1T/18 asci). Linked to <i>spg</i> , <i>sc</i> (<1%).           |                |                                                                                     |



#### LOCI IN LINKAGE GROUP IV

|               |                                                                                                                                 |               |                                                                                                          |
|---------------|---------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------|
| <i>ace-4</i>  | Between <i>cys-10</i> (19%), 27%) and <i>fi</i> (10%).                                                                          | <i>cot-3</i>  | Left of <i>pan-1</i> (16%, 25%). Probably right of <i>arg-2</i> .                                        |
| <i>acon-3</i> | Between <i>cys-10</i> (1%) and <i>cut</i> (33%).                                                                                | <i>cpd-1</i>  | Right of <i>pyr-2</i> (19%).                                                                             |
| <i>acu-2</i>  | Between <i>leu-2</i> (11%) and <i>pan-1</i> (6%).                                                                               | <i>cr-4</i>   | Linked to <i>pdx-1</i> (6%), <i>cot-1</i> (22%).                                                         |
| <i>ad-6</i>   | Between <i>ilv-3</i> (9%) and <i>pan-1</i> (1 or 2 %).                                                                          | <i>cre-1</i>  | Right of <i>irp-4</i> (5 or 6 T, INPD/17 asc).<br>Linked to <i>met-1</i> (6%).                           |
| <i>ads</i>    | Linked to <i>col-4</i> .                                                                                                        | <i>crib-1</i> | Right of <i>irp-4</i> (3T, INPD/18 asc).                                                                 |
| <i>ad-1</i>   | Linked to <i>Cen-IV</i> (0T/17 asc).                                                                                            | <i>crp-3</i>  | Between <i>cys-10</i> (28%; 37%) and <i>fi</i> (4%; 10%).                                                |
| <i>arg-2</i>  | Between <i>col-4</i> (1 or 2%) and <i>T(S4342)<sup>L</sup></i> , <i>pyr-3</i> (1%; 3%).                                         | <i>cut</i>    | Right of <i>pan-1</i> (2%).                                                                              |
| <i>arg-14</i> | Between <i>arg-2</i> (1%), <i>T(S4342)<sup>L</sup></i> , and <i>cyt-19</i> , ( <i>T(NM152)<sup>L</sup></i> , <i>pyr-3</i> (1%). | <i>cya-5</i>  | Right of <i>pan-1</i> (2%).                                                                              |
| <i>bd</i>     | Between <i>met-5</i> (9%) and <i>nit-3</i> (19%).                                                                               | <i>cya-6</i>  | Right of <i>pan-1</i> (2%).                                                                              |
| <i>bid</i>    | Right of <i>pdx-1</i> (4%).                                                                                                     | <i>cya-9</i>  | Left of <i>irp-1</i> (9%).                                                                               |
| <i>btl-3</i>  | Linked to <i>Fsr-13</i> (0T/15 asc), <i>vmd-8</i> (0T/18 asc). Right of <i>irp-4</i> (1T/15 asc).                               | <i>cys-4</i>  | Between <i>rug</i> (10%), <i>T(NM152)<sup>R</sup></i> , and <i>uvs-2</i> (5%).                           |
| <i>car</i>    | Linked to <i>cys-10</i> (1%).                                                                                                   | <i>cys-10</i> | Between <i>Tip IVL</i> and <i>acon-3</i> (1%; 6%).                                                       |
| <i>ceel-1</i> | Linked to <i>pan-1</i> (1%), <i>cot-1</i> (0/17).                                                                               | <i>cys-14</i> | Linked to <i>col-1</i> (21%).                                                                            |
| <i>ceel-2</i> | Linked to <i>col-1</i> (1%), <i>bd</i> .                                                                                        | <i>cys-15</i> | Between <i>pdx-1</i> (0T/55 asc); <i>T(S1229)<sup>L</sup></i> and <i>arg-14</i> , <i>met-1</i> (3%).     |
| <i>Cen-IV</i> | Between <i>cut</i> , <i>fi</i> and <i>psl-1</i> , <i>T(ALS159)</i> .                                                            | <i>cyt-5</i>  | Left of <i>irp-4</i> (9%). Linked to <i>cyt-19</i> (<1%; 5%; 10%).                                       |
| <i>chol-1</i> | Linked to <i>ad-6</i> (1%), probably to the right.                                                                              | <i>cyt-19</i> | Between <i>T(S4342)<sup>L</sup></i> , <i>arg-14</i> and <i>T(NM152)<sup>L</sup></i> , <i>pyr-3</i> (5%). |
| <i>chol-4</i> | Linked to <i>col-1</i> (32%), <i>chol-1</i> (25%).                                                                              | <i>dn</i>     | Linked to <i>rug</i> (1%). Right of <i>pyr-2</i> (4%).                                                   |
| <i>chs-2</i>  | Linked to <i>nit-3</i> (6/18), <i>Fsr-4</i> (0/17), <i>uvs-2</i> (0/18).                                                        | <i>flu-2</i>  | Right of <i>cys-4</i> (2%).                                                                              |
| <i>chs-5</i>  | Between <i>arg-14</i> (2/18) and <i>col-1</i> (1/18).                                                                           | <i>fi</i>     | Between <i>ace-4</i> (10%), <i>cut</i> (4%; 10%) and <i>pyr-1</i> (10%; 15%).                            |
| <i>col</i>    | Between <i>arg-2</i> (2%) and <i>leu-2</i> (12%).                                                                               | <i>fld</i>    | Left of <i>his-5</i> (2%).                                                                               |
| <i>col-1</i>  | Linked to <i>pan-1</i> (0/47 asc), <i>col-1</i> (3%).                                                                           | <i>Fsr-4</i>  | Linked to <i>Tel-IVR</i> (1T/18 asc), <i>chs-2</i> , <i>uvs-2</i> (0/17), <i>nico21</i> (2T/15 asc).     |
| <i>col-4</i>  | Between <i>met-1</i> (4%), <i>mis-26</i> (3%) and <i>arg-2</i> (1 or 2%).                                                       | <i>Fsr-13</i> | Between <i>irp-4</i> (3/15), <i>Fsr-51</i> (1/15) and <i>col-1</i> .                                     |
| <i>col-5</i>  | Linked to <i>col-1</i> (1%), probably to the right.                                                                             | <i>Fsr-51</i> | Between <i>arg-14</i> (2/18), <i>irp-4</i> (2T/18 asc) and <i>col-1</i> (1/18).                          |
| <i>col-6</i>  | Linked to <i>Cen-IV</i> (0T/28 asc), <i>pan-1</i> (21%).                                                                        | <i>Fsr-62</i> | Linked to <i>Fsr-63</i> (0/18), <i>mlr</i> (0/18), <i>arg-14</i> (1/18).                                 |
| <i>col-8</i>  | Linked to <i>pan-1</i> (4%; 13%).                                                                                               | <i>Fsr-63</i> | Between <i>Cen-IV</i> (2T/15 asc) and <i>pyr-1</i> (1T/18 asc), <i>arg-14</i> (1/18).                    |
| <i>con-5</i>  | Linked to <i>col-1</i> (0/18).                                                                                                  | <i>gpl-1</i>  | Linked to <i>ad-6</i> (10%).                                                                             |
| <i>con-9</i>  | Linked to <i>col-1</i> (0/18).                                                                                                  | <i>grey</i>   | Linked to <i>col-1</i> (4%).                                                                             |
| <i>con-10</i> | Linked to <i>col-1</i> (0/18).                                                                                                  | <i>gua-2</i>  | Linked to <i>col-1</i> (5%).                                                                             |
| <i>con-13</i> | Adjoins <i>con-10</i> .                                                                                                         | <i>gut-3</i>  | Linked to <i>col-1</i> (10%), <i>pyr-2</i> (7%).                                                         |

| LOCUS          | LINKAGE GROUP IV (continued)                                                                                                  | LINKAGE GROUP IV (continued)                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <i>his-4</i>   | Between <i>col-1</i> (1%; 4%) and <i>met-5</i> (4%).                                                                          | Between <i>arg-14</i> <i>T(S1229)<sup>R</sup></i> , <i>cyt-19</i> (5%), <i>T(NM152)<sup>L</sup></i> and <i>his-5</i> ( |
| <i>his-5</i>   | Between <i>pyr-3</i> (1%) and <i>col-1</i> (3%; 7%). Linked to <i>cyt-19</i> (5%; 9%).                                        | Between <i>met-5</i> (1/18) and <i>nit-3</i> (2/18).                                                                   |
| <i>hss-1</i>   | Linked to <i>cys-4</i> (2%).                                                                                                  | Between <i>T(S4342)<sup>L</sup></i> and <i>chal-1</i> .                                                                |
| <i>htr-1</i>   | Linked to <i>bd</i> (27%).                                                                                                    | Linked to <i>pan-1</i> (<1%).                                                                                          |
| <i>htr-3</i>   | Linked to <i>met-2</i> (0/129). Between <i>leu-2</i> (4%) and <i>ad-6</i> (9%).                                               | Linked to <i>pdx-1</i> (0/88).                                                                                         |
| <i>inv-1</i>   | Linked to <i>pan-1</i> (0/50).                                                                                                | Between <i>pyr-2</i> (3%) and <i>T(NM152)<sup>R</sup></i> , <i>cys-4</i> (10%).                                        |
| <i>le-1</i>    | Linked to <i>pan-1</i> (1 or 2%). Right of <i>col-1</i> (14%).                                                                | <i>sdv-1</i> , -2, and -3 Between <i>Tel-IVL</i> (12T, ONPD/18 asci) and <i>Cen-IV</i> (≤2T/18 asci).                  |
| <i>leu-2</i>   | Between <i>trp-4</i> (2%) and <i>ilv-3</i> (4%).                                                                              | <i>sdv-7</i> , -8, and -9 Right of <i>trp-4</i> (5T/18 asci), <i>crp-3</i> (1T/18 asci).                               |
| <i>med</i>     | Linked to <i>met-5</i> (5%), <i>pan-1</i> (8%).                                                                               | <i>sdv-11</i> , <i>sdv-12</i> Between <i>pyr-1</i> (4T/18 asci) and <i>trp-4</i> (3T/18 asci).                         |
| <i>met-1</i>   | Linked to <i>arg-2</i> (<1%), probably to the right.                                                                          | <i>ser-4</i> Right of <i>arg-2</i> (<1%).                                                                              |
| <i>met-1</i>   | Between <i>oxD</i> (3%), <i>T(B362j)<sup>L</sup></i> and <i>T(B362j)<sup>R</sup></i> , <i>mus-26</i> (2%), <i>col-4</i> (4%). | Linked to <i>pan-1</i> (8%).                                                                                           |
| <i>met-2</i>   | Linked to <i>ilv-3</i> (0/129). Between <i>trp-4</i> (6%) and <i>pan-1</i> (4%).                                              | Linked to <i>pan-1</i> (1%; 7%), <i>smco-4</i> (30%).                                                                  |
| <i>met-5</i>   | Between <i>his-4</i> (4%) and <i>nit-3</i> (15%).                                                                             | Linked to <i>pan-1</i> (5%), <i>smco-4</i> (2%), <i>smco-8</i> (13%).                                                  |
| <i>mli-1</i>   | Linked to <i>mir</i> (0/18).                                                                                                  | Linked to <i>pyr-1</i> (0T/18 asci).                                                                                   |
| <i>mod(sc)</i> | Linked to <i>pan-1</i> (17%).                                                                                                 | Linked to <i>pan-1</i> (23%).                                                                                          |
| <i>moe-3</i>   | Left of <i>pan-1</i> (17%; 25%), <i>bd</i> (20%).                                                                             | Linked to <i>asn</i> (6%).                                                                                             |
| <i>mir</i>     | Between <i>pdx-1</i> (2%) and <i>col-4</i> (1%).                                                                              | Linked to <i>arg-2</i> (14%).                                                                                          |
| <i>mus-8</i>   | Linked to <i>mir</i> (1%).                                                                                                    | Between <i>his-4</i> and <i>nit-3</i> .                                                                                |
| <i>mus-17</i>  | Between <i>pan-1</i> (2%) and <i>cys-4</i> (25%).                                                                             | At <i>Tip-IVL</i> . Linked to <i>cys-10</i> (0/70).                                                                    |
| <i>mus-26</i>  | Between <i>met-1</i> (2%) and <i>col-4</i> (3%), <i>arg-2</i> (2%).                                                           | At <i>Tip-IVR</i> . Linked to <i>uvs-2</i> (0/49).                                                                     |
| <i>mus-30</i>  | Between <i>mir</i> (8%) and <i>trp-4</i> (4%).                                                                                | Between <i>arg-14</i> , <i>cyt-19</i> and <i>pyr-3</i> .                                                               |
| <i>mus-36</i>  | Between <i>pan-1</i> and <i>uvs-2</i> .                                                                                       | Between <i>rug</i> and <i>cys-4</i> .                                                                                  |
| <i>mut-1</i>   | Linked to <i>trp-4</i> (<3%).                                                                                                 | Between <i>psi</i> and <i>pdx-1</i> .                                                                                  |
| <i>nada</i>    | Linked to <i>ad-6</i> (18%).                                                                                                  | At <i>Tip-IVR</i> . Linked to <i>uvs-2</i> (1/51).                                                                     |
| <i>ndp64</i>   | Linked to <i>Fer-4</i> (0T/18 asci), <i>Tel-IVR</i> (1T/18 asci).                                                             | At <i>Tip-IVR</i> . Linked to <i>uvs-2</i> (1/29).                                                                     |
| <i>nit-3</i>   | Between <i>met-5</i> (15%), <i>bd</i> (19%) and <i>pyr-2</i> (2%; 9%).                                                        | At <i>Tip-IVR</i> . Linked to <i>rug</i> (3/50).                                                                       |
| <i>nit-4</i>   | Between <i>pyr-1</i> (1%; 6%) and <i>pan-1</i> (6%; 27%).                                                                     | Between <i>met-1</i> and <i>col-4</i> .                                                                                |
| <i>nit-9</i>   | Right of <i>nit-4</i> (9%).                                                                                                   | Between <i>cys-15</i> and <i>met-1</i> .                                                                               |
| <i>nuo21</i>   | Linked to <i>Tel-IVR</i> (1T/18 asci), <i>Fsr-4</i> (1 or 2T/18 asci).                                                        | Between <i>pdx-1</i> and <i>cys-15</i> .                                                                               |
| <i>nuo29</i>   | Between <i>trp-4</i> (8 or 9T, INPD/18 asci) and <i>Tel-IVR</i> (8T, INPD/18 asci).                                           | At <i>arg-14</i> .                                                                                                     |
| <i>opi-1</i>   | Linked to <i>T(R2355)</i> , <i>col-1</i> (9%).                                                                                | Between <i>col-1</i> (1/63) and <i>his-4</i> .                                                                         |
| <i>os-2</i>    | Right of <i>col-1</i> (4%).                                                                                                   | Between <i>arg-2</i> and <i>arg-14</i> .                                                                               |
| <i>os-10</i>   | Linked to <i>cut</i> (5%; 21%), <i>col-4</i> (8%; 10%).                                                                       | Between <i>uvs-2</i> and <i>pmb</i> , <i>Tip-IVR</i> .                                                                 |
| <i>osr-1</i>   | Linked to <i>trp-4</i> (20%).                                                                                                 | Linked to <i>nuo21</i> (1T/18 asci).                                                                                   |
| <i>oxD</i>     | Between <i>pdx-1</i> (0T/55 asci), <i>T(S1229)<sup>L</sup></i> and <i>T(B62)<sup>L</sup></i> , <i>met-1</i> (3%).             | Linked to <i>pan-1</i> (1%).                                                                                           |
| <i>pan-1</i>   | Between <i>ad-6</i> (1 or 2%) and <i>col-1</i> (2 or 3%).                                                                     | Marked by <i>T(AR33)</i> . Left of <i>uvs-3</i> , <i>acon-3</i> , <i>cys-10</i> .                                      |
| <i>pdx-1</i>   | Between <i>pyr-1</i> (1%; 10%) and <i>T(S1229)<sup>L</sup></i> , <i>pt</i> (2%).                                              | Marked by <i>T(AR209)</i> and other translocations. Right of <i>cys-4</i> , <i>uvs-2</i> , <i>pmb</i> .                |
| <i>pf</i>      | Right of <i>pyr-2</i> (2%). Linked to <i>rug</i> (3%).                                                                        | Between <i>his-5</i> and <i>trp-4</i> (1%).                                                                            |
| <i>pho-3</i>   | Linked to <i>pan-1</i> (<1%).                                                                                                 | Linked to <i>pho-5</i> (0T/18 asci).                                                                                   |
| <i>pho-5</i>   | Between <i>pyr-1</i> (5%; 2T/18 asci) and <i>trp-4</i> (4T/18 asci), <i>col-1</i> (15%).                                      | Between <i>his-5</i> (3%; 7%), <i>tol</i> (1%) and <i>leu-2</i> (1 or 2%).                                             |
| <i>pmb</i>     | Between <i>uvs-2</i> (8%), <i>T(S4342)<sup>R</sup></i> and <i>Tip-IVR</i> .                                                   | Right of <i>col-1</i> (32%).                                                                                           |
| <i>ppl-1</i>   | Linked to <i>mir</i> (0/18), <i>arg-14</i> (1/18).                                                                            | Linked to <i>met-5</i> (7%).                                                                                           |
| <i>psi-1</i>   | Between <i>Cen-IV</i> and <i>T(ALS159)</i> , <i>pyr-1</i> (4%).                                                               | Linked to <i>pyr-1</i> (0/47). Between <i>T(ALS159)</i> and <i>col-4</i> (5%).                                         |
| <i>pl</i>      | Between <i>pdx-1</i> (2%), <i>T(S1229)<sup>L</sup></i> and <i>col-4</i> (2%).                                                 | Linked to <i>pdx-1</i> (5%) <i>col-4</i> (0/73).                                                                       |
| <i>puu-1</i>   | Between <i>arg-2</i> (5%) and <i>col-1</i> (8%).                                                                              | Between <i>cys-4</i> (5%) and <i>T(S4342)<sup>R</sup></i> , <i>pmb</i> (8%).                                           |
| <i>pyr-1</i>   | Between <i>psi-1</i> (4%), <i>T(ALS159)</i> and <i>pdx-1</i> (<1%; 10%).                                                      | Linked to <i>cys-10</i> (3%; 7%), probably to the left.                                                                |
| <i>pyr-2</i>   | Between <i>nit-3</i> (2%; 9%) and <i>rug</i> (3%), <i>T(NM152)<sup>R</sup></i> .                                              | Near <i>Fsr-62</i> .                                                                                                   |
|                |                                                                                                                               | Right of <i>trp-4</i> (3T/18 asci).                                                                                    |



# LOCI IN LINKAGE GROUP V

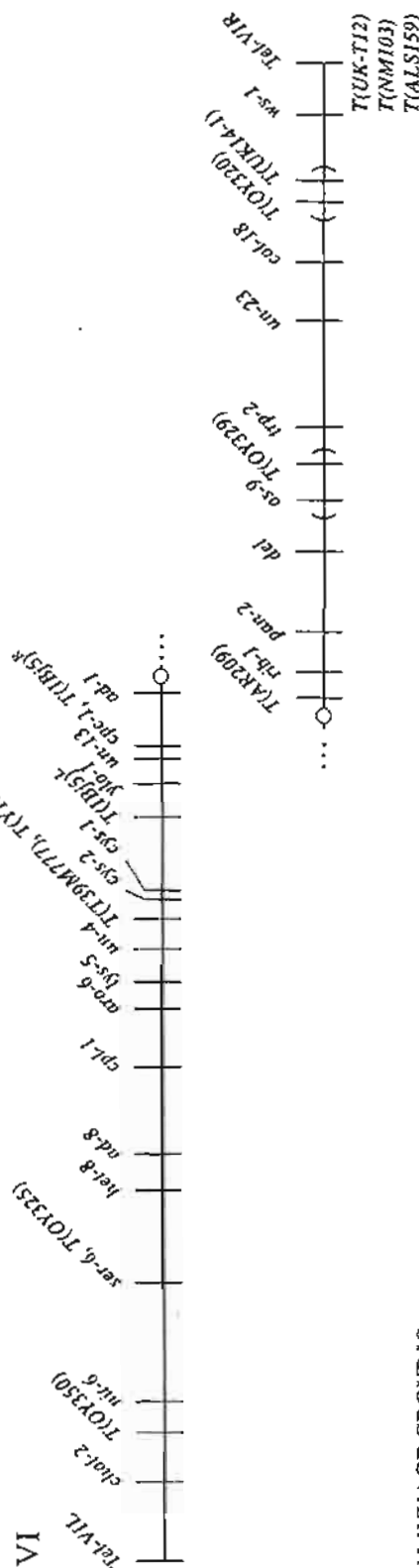
|                    |                                                                                                                             |                 |                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------|
| <i>ace-5</i>       | Between <i>gul-1</i> (<1%) and <i>ure-1</i> (<1%).                                                                          | <i>con-2</i>    | Linked to <i>rDNA</i> (2/18; 4T/18 asci) and <i>con-4a</i> (2/18), <i>lys-1</i> (8T/18 asci).                     |
| <i>act</i>         | Linked near <i>inl</i> .                                                                                                    | <i>con-4a</i>   | Between <i>rDNA</i> (4/18), <i>con-2</i> (2/18) and <i>chs-1</i> (1 or 2/18), <i>am</i> (4/18).                   |
| <i>acu-1</i>       | Right of <i>asn</i> (21%).                                                                                                  | <i>con-4b</i>   | On same plasmid as <i>con-4a</i> .                                                                                |
| <i>acu-3</i>       | Between <i>inl</i> (7%) and <i>asn</i> (20%).                                                                               | <i>col-2</i>    | Between <i>ser-2</i> (5%), <i>T(EB4)<sup>h</sup></i> and <i>ad-7</i> (4%).                                        |
| <i>ad-7</i>        | Between <i>col-2</i> (4%) and <i>T(EB4)<sup>h</sup></i> , <i>ro-4</i> (4%), <i>pab-2</i> (8%).                              | <i>col-4</i>    | Between <i>ser-2</i> (5%) and <i>inl</i> (10%).                                                                   |
| <i>al-3</i>        | Between <i>pho-2</i> (2%) and <i>inl</i> (1%, 1T/18 asci).                                                                  | <i>cpc-3</i>    | Linked to <i>cyh-2</i> (0 or 1/16).                                                                               |
| <i>am</i>          | Between <i>ure-2</i> (2%) and <i>gul-1</i> (<1%), <i>ace-5</i> (<1%), <i>ure-1</i> (1%; 150kb).                             | <i>cpc-4</i>    | Right of <i>inl</i> (9T/18 asci), <i>Fsr-20</i> (1T/18 asci). Linked to <i>sdv-6</i> (0T/18 asci).                |
| <i>arg-4</i>       | Between <i>sp</i> (1%; 11%) and <i>inl</i> (2%, 4%).                                                                        | <i>cya-2</i>    | Linked to <i>al-3</i> (3%), <i>inl</i> (0T/18 asci).                                                              |
| <i>Asc(KH2A83)</i> | Left of <i>al-3</i> ; probably right of <i>his-1</i> .                                                                      | <i>cya-7</i>    | Right of <i>Cen-V</i> .                                                                                           |
| <i>Asm-1</i>       | Linked to <i>al-3</i> (0T/18 asci).                                                                                         | <i>cyb-1</i>    | Between <i>al-3</i> (24%) and <i>his-6</i> (10%).                                                                 |
| <i>asn</i>         | Between <i>inl</i> (4%; 9%) and <i>pyr-6</i> (6%).                                                                          | <i>cyh-2</i>    | Between <i>lys-1</i> (<1%) and <i>leu-5</i> (1 or 2%).                                                            |
| <i>asp</i>         | Between <i>at</i> (0%; 3%) and <i>per-1</i> (16%; 26%).                                                                     | <i>cyt-9</i>    | Between <i>lys-1</i> (5%) and <i>T(MB67)<sup>h</sup></i> , <i>Cen-V</i> (4T/57 asci), <i>at</i> (5%; 2T/55 asci). |
| <i>at</i>          | Linked to <i>Cen-V</i> (0/57 asci). Between <i>cyt-9</i> (2%; 5%) and <i>asp</i> (0%; 3%).                                  | <i>dgr-1</i>    | Between <i>T(UK2-33)</i> , <i>In(UK2-y)<sup>h</sup></i> and <i>T(AR30)</i> , <i>cag-1</i> (7%).                   |
| <i>cag-1</i>       | Between <i>dgr-1</i> (8%), <i>T(AR30)</i> (19%) and <i>mus-16</i> (4%), <i>T(AR33)</i> (5%; 12%).                           | <i>dim-3</i>    | Between <i>am</i> and <i>inl</i> .                                                                                |
| <i>cag-1</i>       | Between <i>Cen-V</i> (4T/18 asci) and <i>ihv-2</i> (4T/18 asci).                                                            | <i>en(am)-1</i> | Between <i>am</i> (8%) and <i>inl</i> (1%).                                                                       |
| <i>cag-6</i>       | Linked to <i>al-3</i> , <i>inl</i> (0 or 1T/18 asci).                                                                       | <i>erg-1</i>    | Between <i>pk</i> (2%) and <i>asn</i> (9%).                                                                       |
| <i>cag-8</i>       | Linked to <i>lys-1</i> , <i>Cen-V</i> (0T/18 asci).                                                                         | <i>err-1</i>    | Left of <i>inl</i> (6%).                                                                                          |
| <i>Cen-V</i>       | Between <i>lys-1</i> (5%), <i>cyt-9</i> (2%), <i>T(MB67)<sup>h</sup></i> and <i>asp</i> . Linked to <i>at</i> (0T/57 asci). | <i>fdh</i>      | Between <i>pyr-6</i> and <i>inl</i> (7%).                                                                         |
| <i>chof-3</i>      | Between <i>at</i> (18%) and <i>al-3</i> (19%; 47%).                                                                         | <i>fla-1</i>    | Contiguous with <i>leu-5</i> .                                                                                    |
| <i>chs-1</i>       | Between <i>con-4a</i> , <i>Fsr-9</i> (1/18) and <i>am</i> (4/18).                                                           | <i>fla-2</i>    | Between <i>leu-5</i> (4%) and <i>ure-2</i> (13%).                                                                 |
| <i>chs-3</i>       | Between <i>am</i> (1 or 2/18) and <i>inl</i> (1 or 2/18).                                                                   | <i>fpr-1</i>    | Between <i>inl</i> (10%) and <i>col-2</i> (3%).                                                                   |
| <i>cil-2</i>       | Linked to <i>inl</i> (1T/18 asci).                                                                                          | <i>fpr-4</i>    | Linked to <i>cyh-2</i> (<1%).                                                                                     |
| <i>cl</i>          | Right of <i>pk</i> (1 or 2%).                                                                                               | <i>Fsr-9</i>    | Right of <i>inl</i> (11%).                                                                                        |
| <i>cmd</i>         | Between <i>inl</i> (3T/18 asci), <i>cya-2</i> (2T/18 asci) and <i>rom70</i> (1 or 2T/17 asci).                              | <i>Fsr-16</i>   | Linked to <i>Cen-V</i> , <i>lys-1</i> (1T/18 asci), <i>con-4</i> , <i>Fsr-16</i> (0T/18 asci).                    |
| <i>cna-1</i>       | Linked to <i>cyh-2</i> .                                                                                                    | <i>Fsr-20</i>   | Linked to <i>Cen-V</i> , <i>lys-1</i> (1T/14 asci).                                                               |
| <i>col-9</i>       | Between <i>inl</i> (16%) and <i>asn</i> (5%).                                                                               | <i>gln-1</i>    | Right of <i>ro-4</i> (1/18).<br>Linked to <i>inl</i> (2%), probably to the right.                                 |

## LOCI IN LINKAGE GROUP V (continued)

|                                  |                                                                                                                  |                      |                                                                                                          |
|----------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------|
| <i>glp-6</i>                     | Left of <i>int</i> (30%).                                                                                        | <i>pab-2</i>         | Linked to <i>ro-4</i> (0/407). Between <i>ad-7</i> (8%), <i>T(EB4)<sup>8</sup></i> and <i>inv</i> (3%).  |
| <i>gna-2</i>                     | Linked to <i>int</i> (0/18).                                                                                     | <i>pcna</i>          | Linked to <i>rDNA</i> (0T/18 asci).                                                                      |
| <i>gran</i>                      | Between <i>pab-2</i> (1%; 8%) and <i>his-6</i> (8%; 27%).                                                        | <i>per-1</i>         | Between <i>asp</i> (16%; 26%) and <i>ilv-1</i> (4%).                                                     |
| <i>gul-1</i>                     | Between <i>am</i> (<0.1%) and <i>ace-5</i> (<1%).                                                                | <i>pho-2</i>         | Between <i>his-1</i> (3%) and <i>int</i> (4%).                                                           |
| <i>hah</i>                       | Linked to <i>int</i> (13%).                                                                                      | <i>pk</i>            | Between <i>met-3</i> (1%) and <i>T(EB4)<sup>1</sup></i> , <i>cat-2</i> (8%).                             |
| <i>hgu-4</i>                     | Between <i>cyh-2</i> (7%) and <i>ure-2</i> (10%).                                                                | <i>pl</i>            | Linked to <i>gran</i> (0/75). Between <i>asn</i> (1%, 9%) and <i>his-6</i> (16%).                        |
| <i>hH1</i>                       | Linked to <i>cog-9</i> , <i>pho-4</i> .                                                                          | Pogo                 | Adjoins <i>Tel-VR</i> .                                                                                  |
| <i>his-1</i>                     | Between <i>am</i> (3%), <i>ure-1</i> (1%) and <i>pho-2</i> (3%), <i>al-3</i> , <i>int</i> (1%; 10%).             | <i>poi-1</i>         | Linked to <i>cyh-2</i> (0T/18 asci).                                                                     |
| <i>his-6</i>                     | Between <i>oak</i> (6%) and <i>T(MM149)</i> (0/499), <i>Tel-VR</i> (30 kb).                                      | <i>pol-d</i>         | Between <i>ure-2</i> (<70kb) and <i>am</i> (10kb).                                                       |
| <i>hsp80</i>                     | Between <i>int</i> (3T/18 asci), <i>cya-2</i> (2T/18 asci) and <i>tom70</i> (1/17 asci).                         | <i>ppt-1</i>         | Linked to <i>int</i> (0/18).                                                                             |
| <i>hsp83</i>                     | Linked to <i>cmd</i> , <i>hsp80</i> (0/18 asci).                                                                 | <i>prd-2</i>         | Between <i>lys-2</i> and <i>am</i> .                                                                     |
| <i>lasc</i>                      | Right of <i>Cen-V</i> .                                                                                          | <i>prd-6</i>         | Linked to <i>ad-7</i> . Between <i>int</i> (9%; 30%) and <i>pab-2</i> (2%).                              |
| <i>ilv-1</i>                     | Between <i>per-1</i> (4%) and <i>ilv-2</i> (<1%; 9%), <i>lys-2</i> (4%; 7%).                                     | <i>Prf</i>           | Linked to <i>al-3</i> (3%), probably to the right.                                                       |
| <i>ilv-2</i>                     | Between <i>ilv-1</i> (<1%; 9%) and <i>lys-2</i> .                                                                | <i>pro-3</i>         | Linked to <i>int</i> , <i>pab-1</i> (0/74). Between <i>his-1</i> (4%) and <i>pk</i> (2%; 6%).            |
| <i>Int(UK2-y)<sup>R</sup> am</i> | Breakpoint in NOR.                                                                                               | <i>psp</i>           | Between <i>al-3</i> (10%; 22%) and <i>his-6</i> (22%; 24%).                                              |
| <i>Int(UK2-y)<sup>R</sup> am</i> | Breakpoint at <i>am</i> .                                                                                        | <i>pvl(PCNA)</i>     | Linked to <i>NOR</i> .                                                                                   |
| <i>int</i>                       | Between <i>al-3</i> (1%; 1/18 asci) and <i>pab-2</i> (1%; 10%).                                                  | <i>pyr-6</i>         | Between <i>asn</i> (6%) and <i>un-9</i> (2%).                                                            |
| <i>inv</i>                       | Between <i>ro-4</i> (5%; 8%), <i>pab-2</i> (3%), <i>mus-11</i> (4%) and <i>asn</i> (4%; 9%).                     | <i>rca-1</i>         | Linked to <i>cyh-2</i> (0T/16 asci).                                                                     |
| <i>leu-5</i>                     | Between <i>cyh-2</i> (1%) and <i>sp</i> (3%; 9%).                                                                | <i>rDNA</i>          | Between <i>Tip-VL</i> and <i>mus-18</i> (0T/17 asci; 20kb), <i>dgr-1</i> . In the NOR.                   |
| <i>lis-3</i>                     | Right of <i>int</i> (4%).                                                                                        | <i>rec-1</i>         | Between <i>ro-4</i> (7%) and <i>asn</i> (5%).                                                            |
| <i>lys-1</i>                     | Between <i>caf-1</i> (4%; 7%) and <i>cyt-9</i> (5%), <i>at</i> (1%; 7%; 20%).                                    | <i>rec-2</i>         | Between <i>sp</i> (1%; 6%) and <i>am</i> (2%).                                                           |
| <i>lys-2</i>                     | Between <i>ilv-1</i> , <i>ilv-2</i> (4%; 7%) and <i>cyh-2</i> (<1%), <i>leu-5</i> (9%).                          | <i>ro-4</i>          | Linked to <i>pab-2</i> (0/407). Between <i>ad-7</i> (4%), <i>T(EB4)<sup>8</sup></i> and <i>inv</i> (5%). |
| <i>mc</i>                        | Linked to <i>cyh-2</i> .                                                                                         | <i>rol-3</i>         | Between <i>ilv-1</i> (2%) and <i>cot-4</i> (5%).                                                         |
| <i>mcb</i>                       | Linked to <i>al-3</i> (3%; 1T/18 asci), <i>cyh-2</i> , <i>sod-2</i> (0T/18 asci).                                | <i>sai</i>           | At <i>Tip-VL</i> , distal to <i>NOR</i> .                                                                |
| <i>md</i>                        | Between <i>sh</i> (3%) and <i>sp</i> (9%).                                                                       | <i>scon-1</i>        | Probably linked to <i>his-6</i> .                                                                        |
| <i>mei-2</i>                     | Between <i>inv</i> (18%) and <i>his-6</i> (12%).                                                                 | <i>scot</i>          | Between <i>al-3</i> (7%) and <i>his-6</i> (11%).                                                         |
| <i>met-3</i>                     | Between <i>pab-1</i> (1%), <i>trp-5</i> (4%) and <i>pk</i> (1%).                                                 | <i>sdu-6</i>         | Linked to <i>crp-4</i> (0T/18 asci). Right of <i>int</i> (9T/18 asci).                                   |
| <i>mya-1</i>                     | Linked to <i>leu-5</i> (0T/18 asci).                                                                             | <i>sen</i>           | Between <i>his-1</i> (4%) and <i>al-3</i> (13%).                                                         |
| <i>mus-11</i>                    | Between <i>ad-7</i> (6%; 11%), <i>pab-2</i> (7%) and <i>inv</i> (4%), <i>un-9</i> (10%), <i>mei-2</i> (5%; 10%). | <i>ser-2</i>         | Between <i>met-3</i> (4%) and <i>T(EB4)<sup>1</sup></i> , <i>cot-2</i> (5%; 8%).                         |
| <i>mus-12</i>                    | Left of <i>int</i> (10%).                                                                                        | <i>sh</i>            | Between <i>ilv</i> (4%; 7%) and <i>mid</i> (3%).                                                         |
| <i>mus-16</i>                    | Between <i>caf-1</i> (4%) and <i>lys-1</i> (9%).                                                                 | <i>smco-6</i>        | Linked to <i>asn</i> (6%) near <i>pyr-6</i> .                                                            |
| <i>mus-18</i>                    | Linked to <i>rDNA</i> (0T/17 asci), <i>con-2</i> (2/17 asci), <i>T(AR190)</i> (<3%).                             | <i>smco-7</i>        | Right of <i>ilv-1</i> (2%). Linked to <i>rol-3</i> (0/154), <i>sp</i> (12%).                             |
| <i>mus-28</i>                    | Left of <i>lys-1</i> (10%).                                                                                      | <i>sod-2</i>         | Linked to <i>cyh-2</i> (0T/18 asci).                                                                     |
| <i>mus-34</i>                    | Between <i>leu-5</i> , <i>ure-2</i> and <i>am</i> , <i>his-1</i> (3%).                                           | <i>sor-5</i>         | Linked to <i>his-1</i> .                                                                                 |
| <i>mus-37</i>                    | Between <i>lys-1</i> and <i>cyh-2</i> .                                                                          | <i>sp</i>            | Between <i>leu-5</i> (3%; 9%) and <i>ure-2</i> (8%; 8%), <i>am</i> (1%; 8%; 450 kb).                     |
| <i>mus(SC17)</i>                 | Left of <i>int</i> (27%).                                                                                        | <i>spco-9</i>        | Linked to <i>asn</i> (6%); right of <i>met-3</i> (18%).                                                  |
| <i>nap</i>                       | Linked to <i>int</i> (15%). Right of <i>ure-2</i> (32%).                                                         | <i>spco-10</i>       | Between <i>ilv-1</i> (24 and <i>int</i> (5%).                                                            |
| <i>nde-1</i>                     | Left of <i>arg-4</i> (2%), <i>int</i> (6%).                                                                      | <i>spe-1</i>         | Between <i>am</i> (1%) and <i>his-1</i> (1%).                                                            |
| <i>nmr</i>                       | Between <i>am</i> (3%; 7%) and <i>gln-1</i> (4%; 10%).                                                           | <i>spe-2</i>         | Left of <i>am</i> (6%), <i>spe-1</i> .                                                                   |
| NOR                              | Between <i>Tip-VL</i> , <i>sat</i> and <i>T(AR30)</i> , <i>dgr-1</i> . Involved in numerous rearrangements.      | <i>spe-3</i>         | Right of <i>int</i> (4%).                                                                                |
| <i>nih-3</i>                     | Between <i>cyh-2</i> (4%) and <i>al-3</i> (17%).                                                                 | <i>ssu-6</i>         | Linked to <i>his-1</i> (4%).                                                                             |
| <i>nuo21.3a</i>                  | Left of <i>int</i> (18%), <i>inv</i> (22%).                                                                      | <i>su(het-d)</i>     | Near <i>lys-1</i> .                                                                                      |
| <i>nuo24</i>                     | Linked to <i>cyh-2</i> (0T/18 asci).                                                                             | <i>su(het-1)</i>     | Right of <i>met-3</i> (4%).                                                                              |
| <i>oak</i>                       | Between <i>un-9</i> (7%) and <i>T(DBL9)</i> , <i>his-6</i> (6%).                                                 | <i>su((imi-1))-f</i> | Left of <i>int</i> (10%).                                                                                |
| <i>pab-1</i>                     | Between <i>int</i> (1%; 10%) and <i>trp-5</i> , <i>met-3</i> (1 or 2%).                                          | <i>T(UK1-35)</i>     | Breakpoint in <i>NOR</i> .                                                                               |

## LOCI IN LINKAGE GROUP V (continued)

|                              |                                                                                                                    |
|------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <i>T(UK2-32)</i>             | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(UK3-41)<sup>L</sup></i> | Between <i>his-1</i> and <i>al-3</i> .                                                                             |
| <i>T(UK3-41)<sup>R</sup></i> | Between <i>pyr-6</i> and <i>oak</i> .                                                                              |
| <i>T(EB4)<sup>L</sup></i>    | Between <i>pk</i> , <i>ser-1</i> and <i>cot-2</i> , <i>wa</i> .                                                    |
| <i>T(EB4)<sup>R</sup></i>    | Between <i>ad-7</i> and <i>ro-4</i> , <i>pab-2</i> .                                                               |
| <i>T(UK4-22)</i>             | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(DBL9)</i>               | Between <i>oak</i> and <i>Tip-R</i> . Left of <i>his-6</i> (0/48).                                                 |
| <i>T(UK14-1)</i>             | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(AR30)</i>               | Between <i>Tip-VL</i> and <i>caf-1</i> .                                                                           |
| <i>T(AR33)</i>               | Between <i>caf-1</i> and <i>lys-1</i> .                                                                            |
| <i>T(R55)</i>                | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(MB67)<sup>L</sup></i>   | Between <i>caf-1</i> and <i>lys-1</i> .                                                                            |
| <i>T(MB67)<sup>R</sup></i>   | Between <i>cyt-9</i> and <i>Cen-V</i> .                                                                            |
| <i>T(NM149)</i>              | Linked to <i>his-6</i> (0/499).                                                                                    |
| <i>T(NM169d)</i>             | Linked to <i>NOR</i> at <i>Tip-VL</i> .                                                                            |
| <i>T(ALS176)</i>             | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(ALS182)</i>             | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(AR190)</i>              | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>T(OY321)</i>              | Breakpoint in <i>NOR</i> .                                                                                         |
| <i>Tel-VR</i>                | Linked to <i>his-6</i> (30kb).                                                                                     |
| <i>Tip-VL</i>                | Marked by <i>sat</i> , <i>NOR</i> , rearrangements. Left of <i>mus-18</i> , <i>dgr-1</i> .                         |
| <i>Tip-VR</i>                | Marked by <i>T(NM149)</i> . Right of <i>his-6</i> .                                                                |
| <i>tom40</i>                 | Linked to <i>cyh-2</i> (0T/15 asci).                                                                               |
| <i>tom70</i>                 | Right of <i>int1</i> (6 or 7T/17 asci).                                                                            |
| <i>trp-5</i>                 | Between <i>int1</i> , <i>pab-1</i> and <i>met-3</i> (4%).                                                          |
| <i>ts</i>                    | Linked to <i>int1</i> (4%).                                                                                        |
| <i>uc-4</i>                  | Between <i>int1</i> (12%) and <i>his-6</i> (11%).                                                                  |
| <i>udk</i>                   | Left of <i>uc-4</i> (29%).                                                                                         |
| <i>un-9</i>                  | Between <i>pyr-6</i> (3%) and <i>oak</i> (7%), <i>his-6</i> (5%; 7%).                                              |
| <i>un-11</i>                 | Left of <i>his-1</i> (<1%).                                                                                        |
| <i>un-19</i>                 | Linked to <i>al-3</i> (9%), <i>un-11</i> (14%).                                                                    |
| <i>ure-1</i>                 | Between <i>ace-5</i> (<1%) and <i>his-1</i> (<1%).                                                                 |
| <i>ure-2</i>                 | Between <i>sp</i> (8%) and <i>am</i> (2%), <i>ure-1</i> (3%).                                                      |
| <i>usg-1</i>                 | Linked to <i>am</i> (3.5kb).                                                                                       |
| <i>val</i>                   | Linked to <i>ilv-2</i> (0/135).                                                                                    |
| <i>vma-1</i>                 | Between <i>leu-5</i> (1/18 asci), <i>sp</i> (8%) and <i>am</i> (2%, ~40kb), <i>al-3</i> (1/18 asci).               |
| <i>vma-3</i>                 | Between <i>his-1</i> and <i>al-3</i> . Linked to <i>leu-5</i> (0T/17 asci), <i>vma-1</i> (~1100kb), <i>cyh-2</i> . |
| <i>wa</i>                    | Between <i>pk</i> , <i>T(EB4)<sup>L</sup></i> and <i>ad-7</i> (4%).                                                |



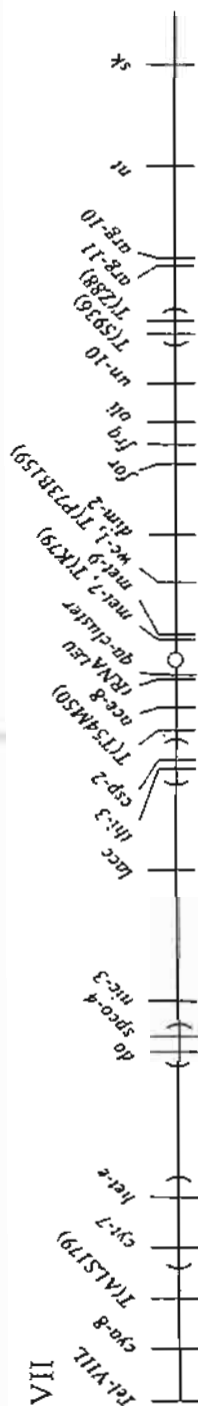
## LOCI IN LINKAGE GROUP VI

|               |                                                                                                      |                                 |                                                                                               |
|---------------|------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------|
| <i>acu-6</i>  | Left of <i>cys-1</i> (3%).                                                                           | <i>hel-8</i>                    | Between <i>ser-6</i> (8%) and <i>ad-8</i> (3%, 12%).                                          |
| <i>ad-1</i>   | Between <i>ser-6</i> (6%) and <i>Cen-VI</i> (1 or 2%), <i>glp-4</i> (0; 2%).                         | <i>hel-9</i>                    | Between <i>T(AR209)</i> and <i>T(OY329)</i> , hence, between <i>Cen-VI</i> and <i>trp-2</i> . |
| <i>ad-8</i>   | Between <i>ser-6</i> (15%) and <i>cpl-1</i> (7%; 11%), <i>aro-6</i> (12%).                           | <i>hsp-1</i>                    | Linked to <i>Bml</i> , <i>Cen-VI</i> , <i>pan-2</i> (OT/18 asci).                             |
| <i>age-2</i>  | Right of <i>ws-1</i> (8%).                                                                           | <i>lgs</i>                      | Linked to <i>chol-2</i> (7/32). Between <i>Tip-VIL</i> and <i>T(OY350)</i> .                  |
| <i>aro-6</i>  | Between <i>ad-8</i> (8%; 12%), <i>cpl-1</i> (5%) and <i>lys-5</i> (3%).                              | <i>lis-2</i>                    | Between <i>chol-2</i> (11%) and <i>trp-2</i> (26%).                                           |
| <i>asd-1</i>  | Between <i>nuo19.3</i> (5T/18 asci) and <i>cml</i> (2 or 3 T/18 asci), <i>Bml</i> (5 or 6T/18 asci). | <i>lys-5</i>                    | Between <i>cyl-2</i> (6%), <i>aro-6</i> (3%) and <i>un-4</i> (2%).                            |
| <i>asd-3</i>  | Adjoins <i>asd-1</i> .                                                                               | <i>mod-5</i>                    | Linked to <i>Cen-VI</i> (3% 2nd division), <i>trp-2</i> .                                     |
| <i>Bml</i>    | Between <i>cys-2</i> (2%), <i>cpc-1</i> and <i>ad-1</i> , <i>Cen-VI</i> .                            | <i>moe-2</i>                    | Linked to <i>trp-2</i> (4%), probably to the left.                                            |
| <i>cax</i>    | Linked to <i>Tel-VIL</i> (3T/18 asci).                                                               | <i>mus-14</i>                   | Linked to <i>lys-5</i> .                                                                      |
| <i>Cen-VI</i> | Between <i>ad-1</i> (1 or 2%) and <i>T(AR209)</i> , <i>rib-1</i> (1%; 4%), <i>pan-2</i> (2%).        | <i>mus-29</i>                   | Between <i>chol-2</i> (14%) and <i>lys-5</i> (15%).                                           |
| <i>chol-2</i> | Between <i>Tip-VIL</i> and <i>nit-6</i> (6%; 8%).                                                    | <i>mus-39</i>                   | Right of <i>ylo-1</i> (3%; 8%). Linked to <i>mus-29</i> (10%).                                |
| <i>chr</i>    | Between <i>chol-2</i> (10%) and <i>pan-2</i> .                                                       | <i>nit-6</i>                    | Between <i>chol-2</i> (6%), <i>T(OY350)</i> and <i>ser-6</i> (11%).                           |
| <i>cml</i>    | Between <i>asd-1</i> (2T/18 asci) and <i>Bml</i> , <i>Cen-VI</i> 1/18; 1T/18 asci).                  | <i>nuh-10</i>                   | Linked to <i>trp-2</i> .                                                                      |
| <i>col-18</i> | Between <i>un-23</i> (3/28) and <i>T(OY320)</i> .                                                    | <i>nuo19.3</i>                  | Between <i>gdh-1</i> (9T/18 asci) and <i>asd-1</i> (5T/18 asci), <i>Bml</i> (10T/18 asci).    |
| <i>con-3</i>  | Linked to <i>Bml</i> (0/18).                                                                         | <i>nuo21.3c</i>                 | asci).                                                                                        |
| <i>con-11</i> | Right of <i>Cen-VI</i> (6T/17 asci). Linked to <i>trp-2</i> (0/18).                                  | <i>nuo30.4</i>                  | Linked to <i>Tel-VIR</i> (0 or 1T/18 asci).                                                   |
| <i>cpc-1</i>  | Between <i>ylo-1</i> (1%; 3%; 143 kb), <i>un-13</i> (105kb) and <i>Cen-VI</i> .                      | <i>os-9</i>                     | Linked to <i>Bml</i> , <i>Cen-VI</i> , <i>pan-2</i> (OT/18 asci).                             |
| <i>cpl-1</i>  | Between <i>ad-8</i> (7%; 11%) and <i>aro-6</i> (5%), <i>lys-5</i> (6%), <i>un-25</i> (2%; 4%).       | <i>pan-2</i>                    | Between <i>ad-1</i> , <i>del</i> and <i>trp-2</i> .                                           |
| <i>cya-3</i>  | Between <i>chol-2</i> (10%) and <i>cyl-2</i> (10%).                                                  | <i>rib-1</i>                    | Between <i>rib-1</i> (<1%; 3%) and <i>del</i> (6%), <i>trp-2</i> (11%).                       |
| <i>cys-1</i>  | Between <i>cys-2</i> (1%; 3%) and <i>ylo-1</i> (8%).                                                 | <i>ser-6</i>                    | Between <i>Cen-VI</i> (1%), <i>glp-4</i> (4%), <i>T(AR209)</i> and <i>pan-2</i> (3%).         |
| <i>cys-2</i>  | Between <i>un-4</i> (4%), <i>T(T39M77)</i> , <i>T(Y18329)</i> and <i>cys-1</i> (1%; 3%).             | <i>ser-1</i>                    | Between <i>nit-6</i> (10%) and <i>hel-8</i> (8%), <i>ad-8</i> (16%).                          |
| <i>cyl-15</i> | Between <i>cya-3</i> (10%) and <i>lys-5</i> (6%).                                                    | <i>spr-1</i>                    | Left of <i>ylo-1</i> (3%).                                                                    |
| <i>del</i>    | Between <i>pan-2</i> (4%) and <i>trp-2</i> (3%).                                                     | <i>sprco-7</i>                  | Linked to <i>ad-1</i> (0/65). Between <i>ylo-1</i> (4%) and <i>T(AR209)</i> .                 |
| <i>edr-1</i>  | Between <i>pan-2</i> (6%) and <i>os-9</i> , <i>T(OY329)</i> , <i>trp-2</i> (0; 13%).                 | <i>sprco-13</i>                 | Linked to <i>trp-2</i> (16%), <i>Cen-VI</i> (1/10 asci).                                      |
| <i>edr-2</i>  | Linked to <i>ad-1</i> , <i>pan-2</i> (<1%).                                                          | <i>ssu-7</i>                    | Between <i>ad-8</i> (8%) and <i>ylo-1</i> (14%).                                              |
| <i>fpr-6</i>  | Left of <i>ad-1</i> (19%).                                                                           | <i>su(mir<sup>26</sup>)</i>     | Linked to <i>pan-2</i> , <i>trp-2</i> . Right of <i>Cen-VI</i> .                              |
| <i>fpr-50</i> | Between <i>pan-2</i> and <i>trp-2</i> .                                                              | <i>su(trp-5)</i>                | Near <i>aro-6</i> (Perhaps an allele).                                                        |
| <i>gdh-1</i>  | Linked to <i>Bml</i> (0/18), <i>Cen-VI</i> , <i>pan-2</i> (OT/18 asci).                              | <i>T(BJ5)<sup>+</sup></i>       | Between <i>cys-1</i> and <i>ylo-1</i> .                                                       |
| <i>glp-4</i>  | Linked to <i>tom22</i> (OT/16 asci).                                                                 | <i>T(BJ5)<sup>+</sup> cpc-1</i> | At <i>cpc-1</i> .                                                                             |
| <i>gul-5</i>  | Between <i>ad-1</i> (0; 2%) and <i>rib-1</i> (3%; 4%).                                               | <i>T(UK-T12)</i>                | At <i>Tip-VIR</i> .                                                                           |
|               | Linked to <i>trp-2</i> (10%).                                                                        | <i>T(UK14-1)</i>                | Between <i>un-23</i> and <i>ws-1</i> .                                                        |



## LOCI IN LINKAGE GROUP VI (continued)

|                   |                                                                                                                  |
|-------------------|------------------------------------------------------------------------------------------------------------------|
| <i>T(T39M777)</i> | Between <i>un-4</i> and <i>cys-1</i> .                                                                           |
| <i>T(NM103)</i>   | At <i>Tip-VTR</i> .                                                                                              |
| <i>T(ALS159)</i>  | At <i>Tip-VTR</i> .                                                                                              |
| <i>T(AR209)</i>   | Between <i>Cen-VI</i> and <i>rib-1</i> .                                                                         |
| <i>T(OY320)</i>   | Between <i>un-23</i> and <i>ws-1</i> .                                                                           |
| <i>T(OY329)</i>   | Between <i>del</i> and <i>irp-2</i> .                                                                            |
| <i>T(OY343)</i>   | At <i>Tip-VTR</i> .                                                                                              |
| <i>T(OY347)</i>   | At <i>Tip-VIL</i> .                                                                                              |
| <i>T(OY350)</i>   | Between <i>chol-2</i> and <i>nit-6</i> .                                                                         |
| <i>T(Y18329)</i>  | Between <i>un-4</i> and <i>cys-1</i> .                                                                           |
| <i>Tel-VTL</i>    | Linked to <i>cax</i> (3T/18 asci).                                                                               |
| <i>Tel-VTR</i>    | Linked to <i>T(UK-T12)</i> (0/13; 0T/9 asci), <i>nuo21</i> 3c (0T/18 asci)                                       |
| <i>if2d</i>       | Left of <i>T(T39M777)</i> .                                                                                      |
| <i>tim17</i>      | Linked to RFLP markers.                                                                                          |
| <i>Tip-VIL</i>    | Left of <i>chol-2</i> .                                                                                          |
| <i>Tip-VTR</i>    | Marked by <i>T(NM103)</i> and others. Right of <i>ws-1</i> , <i>col-18</i> .                                     |
| <i>tom22</i>      | Linked to <i>gdh-1</i> (0T/16 asci), <i>nuo19.3</i> (9T/18 asci).                                                |
| <i>irp-2</i>      | Between <i>del</i> (0; 13%), <i>T(OY329)</i> and <i>un-23</i> (5%; 27%).                                         |
| <i>un-4</i>       | Between <i>lys-5</i> (2%, in the same plasmid) and <i>T(T39M777)</i> , <i>un-13</i> (3%).                        |
| <i>un-13</i>      | Between <i>ylo-1</i> (2%; 38kb) and <i>cpc-1</i> (1 or 2%; 105kb).                                               |
| <i>un-23</i>      | Between <i>irp-2</i> (5%; 27%) and <i>col-18</i> (3/28), <i>T(OY320)</i> , <i>T(UK14-1)</i> , <i>ws-1</i> .      |
| <i>un-25</i>      | Between <i>cpl-1</i> (4%) and <i>ylo-1</i> (0/86).                                                               |
| <i>vvd</i>        | Between <i>T(IBJ5)<sup>+</sup></i> , <i>ylo-1</i> and <i>T(IBJ5)<sup>+</sup></i> , <i>cpc-1</i> .                |
| <i>ws-1</i>       | Between <i>irp-2</i> (38%), <i>un-23</i> , <i>T(OY320)</i> , <i>T(UK14-1)</i> and <i>Tip-VTR</i> .               |
| <i>ws-2</i>       | Linked to <i>ylo-1</i> (16%), <i>irp-2</i> (2%).                                                                 |
| <i>ylo-1</i>      | Between <i>cys-1</i> (8%), <i>T(IBJ5)<sup>+</sup></i> and <i>un-13</i> (2%; 38kb), <i>cpc-1</i> (1%; 3%; 143kb). |



# LOCUS LINKAGE GROUP VII

|                |                                                                                                      |                    |                                                                                           |
|----------------|------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------|
| <i>ace-8</i>   | Between <i>thi-3</i> (1%) and <i>TTS4M50</i> and <i>qa</i> cluster (2 or 3%).                        | <i>kyn-1</i>       | Linked to <i>nic-3</i> (30%), <i>wc-1</i> (20%)                                           |
| <i>acu-9</i>   | Linked to <i>nic-3</i> (29%).                                                                        | <i>lacc</i>        | Between <i>nic-3</i> (14%) and <i>thi-3</i> (7%)                                          |
| <i>acu-11</i>  | Linked to <i>arg-10</i> (21%).                                                                       | <i>le-2</i>        | Linked to <i>mei-7</i> (7%)                                                               |
| <i>adh</i>     | Linked to <i>do</i> (0/53), <i>spo-4</i> (4%), Between <i>cyr-7</i> (9%) and <i>nic-3</i> (4%, 11%). | <i>mak-2</i>       | By cosmid assignment to chromosomal DNA. Tentative.                                       |
| <i>aga</i>     | Between <i>wc-1</i> (2%) and <i>arg-10</i> (24%, 27%).                                               | <i>mb-1</i>        | Linked to <i>nic-3</i> , <i>wc-1</i> (23%)                                                |
| <i>aln-1</i>   | Linked in VII.                                                                                       | <i>mel-1</i>       | Left of <i>thi-3</i> (27%)                                                                |
| <i>arg-10</i>  | Between <i>TTS4M50</i> , <i>arg-11</i> (1 or 2%) and <i>ni</i> (1%, 12%).                            | <i>met-7</i>       | Between <i>Cen-III</i> (<1%) and <i>mei-9</i> (10 <sup>-4</sup> ), <i>wc-1</i> .          |
| <i>arg-11</i>  | Between <i>TTS4M50</i> and <i>arg-10</i> (1 or 2%).                                                  | <i>met-9</i>       | Between <i>mei-7</i> (10 <sup>-4</sup> ) and <i>wc-1</i> (1 or 2%).                       |
| <i>ars-1</i>   | Between <i>thi-3</i> (2%, 5%) and <i>qa</i> , <i>Cen-III</i> , <i>mei-7</i> (1%).                    | <i>mgk-1</i>       | By cosmid assignment to chromosomal DNA. Tentative.                                       |
| <i>asd-2</i>   | Linked to <i>nic-3</i> (15%), <i>ars-1</i> (36%).                                                    | <i>mo-2</i>        | Linked to <i>for</i> (16%), <i>ni</i> (29%)                                               |
| <i>bn</i>      | Linked to <i>mei-7</i> (0/93), <i>wc-1</i> (1%), Right of <i>TTS4M50</i> , <i>thi-3</i> (2%).        | <i>msh-2</i>       | Linked to <i>for</i> , <i>frq</i> (0/18 asc) Right of <i>Cen-III</i> (1/18 asc)           |
| <i>car-2</i>   | Linked to <i>for</i> , <i>frq</i> (8 to 10 T, ONPD/18 asc), <i>cox-8</i> (4 to 6 T, 1 NP/D/18 asc)   | <i>mis-10</i>      | Right of <i>mei-7</i> (7%)                                                                |
| <i>cag-9</i>   | Linked to <i>nic-3</i> (2/18 asc)                                                                    | <i>mis-25</i>      | Between <i>mei-7</i> (4%, 6%) and <i>un-10</i> (8%).                                      |
| <i>cdi-2</i>   | Between <i>nic-3</i> and <i>mei-7</i> .                                                              | <i>mis-33</i>      | Between <i>mei-7</i> (10%) and <i>un-10</i> (8%).                                         |
| <i>Cen-III</i> |                                                                                                      | <i>mis-35</i>      | Right of <i>nic-3</i> (<9%)                                                               |
| <i>cfp</i>     | Between <i>ars-1</i> , <i>qa</i> cluster and <i>mei-7</i> (1%).                                      | <i>nic-3</i>       | Between <i>do</i> (3%), <i>spo-4</i> (1%) and <i>lacc</i> (14%), <i>thi-3</i> (9%, 27%)   |
| <i>col-2</i>   | Between <i>for</i> (1 or 2/18 asc) and <i>TTS4M50</i> , Near <i>ras-3</i> , <i>un-10</i> .           | <i>nop-1</i>       | <i>asp-2</i> (16%, 22%).                                                                  |
| <i>col-17</i>  | Linked to <i>mei-7</i> (1%), probably to the left. Right of <i>TTS4M50</i> .                         | <i>ni</i>          | Linked to <i>nic-3</i> (3/18 asc), <i>ars-1</i> (2/18 asc)                                |
| <i>cox-8</i>   | Linked to <i>ni</i> (14%), <i>spo-5</i> (6%).                                                        | <i>oli</i>         | Between <i>arg-10</i> (2%, 12%) and <i>sk</i> (7%, 18%).                                  |
| <i>cpc-2</i>   | Linked to <i>un-10</i> (3/17), <i>lacc</i> (4/18).                                                   | <i>pen-1</i>       | Between <i>for</i> , <i>frq</i> (<2%) and <i>un-10</i>                                    |
| <i>csp-2</i>   | Linked to <i>arg-10</i> (18%), Right of <i>TTS4M50</i> .                                             | <i>pep-4</i>       | Linked to <i>csp-2</i> (4%).                                                              |
| <i>cya-8</i>   | Between <i>Tip-MIL</i> and <i>T(ALS179)</i> (5%), <i>cyr-7</i> (7%).                                 | <i>pfa-1</i>       | Linked to <i>for</i> , <i>frq</i> (0/18 asc)                                              |
| <i>cyr-6</i>   | Linked to <i>wc-1</i> (2%).                                                                          | <i>pfa-4</i>       | Linked to <i>csp-2</i> (35%)                                                              |
| <i>cyr-7</i>   | Between <i>T(ALS179)</i> and <i>adh</i> (9%), <i>nic-3</i> (18%)                                     | <i>pho-4</i>       | Linked to <i>csp-2</i> (33%)                                                              |
| <i>dim-2</i>   | Between <i>wc-1</i> and <i>un-10</i> , <i>arg-10</i> .                                               | <i>poi-2</i>       | Linked to <i>nic-3</i> (2%, 6%; 1 or 2 T/18 asc)                                          |
| <i>do</i>      | Linked to <i>spo-4</i> (<1%), Left of <i>nic-3</i> (1%, 3%).                                         | <i>qa</i> cluster  | Between <i>car-2</i> (0 or 1 T/18 asc) and <i>cox-8</i> (1 T/18 asc)                      |
| <i>dr</i>      | Between <i>for</i> (3%) and <i>TTS4M50</i> , <i>arg-10</i> (12%)                                     | <i>ras-3</i>       | Between <i>ars-1</i> , <i>rRNA<sup>LSU</sup></i> and <i>Cen-III</i> , <i>mei-7</i> (<1%). |
| <i>for</i>     | Between <i>wc-1</i> (6%) and <i>frq</i> (2%), <i>oli</i> (5 or 6%), <i>dr</i> (3%).                  | <i>rol-2</i>       | Adjacent to <i>thi-5</i> (300bp). Near <i>un-10</i> .                                     |
| <i>frq</i>     | Between <i>wc-1</i> , <i>for</i> (3%), and <i>oli</i> (<2%), <i>un-10</i> .                          | <i>sdi-13, -14</i> | Linked to <i>mei-7</i> (<1%), <i>wc-1</i> (3%).                                           |
| <i>gul-4</i>   | Linked to <i>nic-3</i> (17%).                                                                        | <i>sfo</i>         | Linked to <i>ars-1</i> , <i>Cen-III</i> (0/18).                                           |
| <i>het-4</i>   | Between <i>cya-8</i> , <i>T(ALS179)</i> and <i>nic-3</i> (28%).                                      | <i>sk</i>          | Between <i>thi-3</i> (6%) and <i>hlp-1</i> (1%, 9%). Linked to <i>Cen-III</i> (<1%)       |
| <i>het-10</i>  | Between <i>dr</i> , <i>TTS4M50</i> and <i>Tip-MIL</i> .                                              | <i>sk</i>          | Between <i>ni</i> (7%, 17%) and <i>Tip-MIL</i> .                                          |
| <i>hhl</i>     | Linked to <i>cag-9</i> , <i>pho-4</i> .                                                              | <i>slo-2</i>       | Left of <i>mei-7</i> (2%).                                                                |
| <i>hH2A</i>    | Linked to <i>Cen-III</i> (1 T/18 asc)                                                                | <i>sor-2</i>       | Linked to <i>ni</i> (31%)                                                                 |
| <i>hH2B</i>    | Linked to <i>Cen-III</i> . Adjoints <i>hH2A</i> .                                                    | <i>spo-4</i>       | Linked to <i>do</i> (<1%), <i>nic-3</i> (1%).                                             |
| <i>hlp-1</i>   | Between <i>sfo</i> (1%, 9%) and <i>ni</i> (28%, 37%).                                                | <i>spo-5</i>       | Linked to <i>col-17</i> (6%), <i>ni</i> (20%)                                             |
| <i>hlp-2</i>   | Between <i>hlp-1</i> (8%, 25%) and <i>ni</i> (29%)                                                   | <i>spo-6</i>       | Right of <i>thi-3</i> (4%). Linked to <i>spo-5</i> (8%), <i>ni</i> (20%)                  |
| <i>ile-1</i>   | Between <i>ars</i> (1%) and <i>wc-1</i> (3%)                                                         |                    |                                                                                           |

# LOCUS LINKAGE GROUP VII (continued)

|                                  |                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <i>ssu-1</i>                     | Between <i>met-7</i> (14%) and <i>su(trp-3<sup>Δ20</sup>)-1</i> (10%), <i>ni</i> (23%).                                  |
| <i>ssu-4</i>                     | Between <i>nic-3</i> (28%) and <i>met-7</i> (20%).                                                                       |
| <i>su(met-1)-5</i>               | Left of <i>nic-3</i> (23%).                                                                                              |
| <i>su(trp-3<sup>Δ20</sup>)-1</i> | Between <i>met-7</i> (18%), <i>ssu-1</i> (10%), 13% and <i>arg-10</i> (7%).                                              |
| <i>su(trp-3<sup>Δ20</sup>)-2</i> | Linked to <i>su(trp-3<sup>Δ20</sup>)-1</i> , probably to the left.                                                       |
| <i>T(T54M50)</i>                 | Between <i>thi-3</i> , <i>csp-2</i> and <i>ace-8</i> .                                                                   |
| <i>T(Z88)</i>                    | Between <i>dr</i> and <i>arg-10</i> .                                                                                    |
| <i>T(ALS179)</i>                 | Between <i>cya-8</i> and <i>arg-10</i> .                                                                                 |
| <i>T(S936)</i>                   | Between <i>dr</i> and <i>arg-10</i> .                                                                                    |
| <i>Tel-VIII</i>                  | Linked to <i>nic-3</i> , <i>pho-4</i> (10T, 1NPD/18 asci)                                                                |
| <i>thi-3</i>                     | Linked to <i>csp-2</i> (<1%). Between <i>nic-3</i> (9%, 28%), <i>lace</i> (7%) and <i>T(T54M50)</i> , <i>ace-8</i> (1%). |
| <i>thi-6</i>                     | Adjacent to <i>ras-3</i> (300 bp). Near <i>un-10</i> .                                                                   |
| <i>Tip-VII</i>                   | Left of <i>cya-8</i> .                                                                                                   |
| <i>Tip-VIII</i>                  | Right of <i>sk</i> .                                                                                                     |
| <i>tnr</i>                       | Between <i>nic-3</i> (3T/18 asci) and <i>ars-1</i> (2T/18 asci), <i>Cen-III</i> (3T/18 asci).                            |
| <i>tns</i>                       | Between <i>T(S936)</i> and <i>arg-10</i> .                                                                               |
| <i>IRN450</i>                    | Between <i>ars-1</i> and <i>qa-1</i> cluster.                                                                            |
| <i>ud-1</i>                      | Between <i>met-7</i> (27%) and <i>arg-10</i> (10%).                                                                      |
| <i>un-10</i>                     | Between <i>for</i> , <i>frq</i> , <i>olt</i> and <i>arg-10</i> .                                                         |
| <i>un-22</i>                     | Linked to <i>met-7</i> (1%).                                                                                             |
| <i>wc-1</i>                      | Between <i>met-9</i> (1%, 4%) and <i>for</i> (6%).                                                                       |