Supplementary material

S1. Table of location data for new specimens appearing on the maximum likelihood tree, in tree order

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| NID | Species | Stage | Locality\*\* | Ecoregion | GenBank Accession # |
| 1057 | *Mesocriconema* sp. | J | Spring Creek Prairie, NE | Central Tall Grasslands | KY574851 |
| 2973 | *Mesocriconema* sp. | F | Red Rock Prairie Preserve, MN | Central Tall Grasslands | KY574854 |
| 1051 | *Mesocriconema* sp. | F | Stafford County, KS | Central and Southern Mixed Grasslands | KY574849 |
| 1129 | *Mesocriconema* sp. | F | Avoca Prairie and Savanna State Natural Area, WI | Upper Midwest Forest-Savanna Transition Zone | KY574852 |
| 1388 | *Mesocriconema* sp. | F | Nine-Mile Prairie, NE | Central Tall Grasslands | KY574853 |
| 5501 | *Mesocriconema* sp. | J | Clymer Meadows, TX | Texas Blackland Prairies | KY574858 |
| 5515 | *Mesocriconema* sp. | F | Downs Prairie Natural Area, AR | Mississippi Lowland Forests | KY574855 |
| 1054 | *Mesocriconema* sp. | F | Spring Creek Prairie, NE | Central Tall Grasslands | KY574850 |
| 5502 | *Mesocriconema* sp. | F | Roth Prairie Natural Area, AR | Mississippi Lowland Forests | KY574847 |
| 5505 | *Mesocriconema* sp. | F | Roth Prairie Natural Area, AR | Mississippi Lowland Forests | KY574846 |
| 3086 | *Mesocriconema nebraskense* | F | Hayden Prairie Preserve, IA | Central Tall Grasslands | KY574844 |
| 5506 | *Mesocriconema nebraskense* | J | Roth Prairie Natural Area, AR | Mississippi Lowland Forests | KY574845 |
| 956 | *Mesocriconema* sp. | F | Schluckebier Prairie State Natural Area, WI | Upper Midwest Forest-Savanna Transition Zone | KY574848 |
| 3660 | *Mesocriconema* sp. | F | Lance Rosier Unit, BITH, TX | Piney Woods Forests | KY574856 |
| 5527 | *Mesocriconema* sp. | F | Warren Prairie Natural Area, AR | Piney Woods Forests | KY574857 |
| 1300 | *Mesocriconema* sp. | F | Lowndes County, MS | Southeastern Mixed Forests | MF094913 |
| 5540 | *Mesocriconema* sp. | J | Chihuahuan Desert Research Institute, TX | Chihuahan Desert | MF095012 |
| 2557 | *Mesocriconema xenoplax* | F | Autauga County, AL | Southeastern Mixed Forests | MF094929 |
| 5603 | *Mesocriconema xenoplax* | J | Big Sandy Creek Unit, BITH, TX | Piney Woods Forests | MF095022 |
| 5587 | *Mesocriconema xenoplax* | F | Tuskegee National Forest, AL | Southeastern Mixed Forests | MF095021 |
| 3320 | *Mesocriconema xenoplax* | J | Twin Creeks, GRSM, TN | Appalachian-Blue Ridge Forests | MF094992 |
| 728 | *Mesocriconema xenoplax* | F | Pickens County, SC | Southeastern Mixed Forests | MF094896 |
| 2920 | *Mesocriconema inaratum* | J | Aurora Prairie Preserve, SD | Central Tall Grasslands | MF094949 |
| 7003 | *Mesocriconema inaratum* | F | Prairie Pines, NE | Central Tall Grasslands | MF095030 |
| 2919 | *Mesocriconema inaratum* | F | Aurora Prairie Preserve, SD | Central Tall Grasslands | MF094948 |
| 1135 | *Mesocriconema inaratum* | F | Nine-Mile Prairie, NE | Central Tall Grasslands | MF094903 |
| 1375 | *Mesocriconema xenoplax* | F | Nine-Mile Prairie, NE | Central Tall Grasslands | MF094916 |
| 1346 | *Mesocriconema xenoplax* | F | Great Falls Park, GWMP, VA | Southeastern Mixed Forests | MF094915 |
| 3078 | *Mesocriconema xenoplax* | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094971 |
| 2694 | *Mesocriconema xenoplax* | F | Albright Grove, GRSM, TN | Appalachian-Blue Ridge Forests | MF094932 |
| 3491 | *Mesocriconema xenoplax* | F | West Point, GRSM, TN | Appalachian-Blue Ridge Forests | MF095002 |
| 2905 | *Mesocriconem*a sp. | F | Barta Brothers Ranch, NE | Nebraska Sandhills Mixed Grasslands | MF094946 |
| 3175 | *Mesocriconema* sp. | F | Kellogg-Weaver Dunes SNA, MN | Central Tall Grasslands | MF094977 |
| 2627 | *Mesocriconema ericaceum* | F | Brushy Mtn., GRSM, TN | Appalachian-Blue Ridge Forests | KX290602 |
| 5976 | *Mesocriconema ericaceum* | J | Brushy Mtn., GRSM, TN | Appalachian-Blue Ridge Forests | KX290603 |
| 5990 | *Mesocriconema ericaceum* | F | Brushy Mtn., GRSM, TN | Appalachian-Blue Ridge Forests | KX290604 |
| 443 | *Mesocriconema discus* | J | Brookings County, SD | Central Tall Grasslands | MF094892 |
| 570 | *Mesocriconema* sp. | J | Jonathan Dickinson State Park, FL | Florida Sand Pine Scrub | MF094894 |
| 3187 | *Mesocriconema* sp. | F | Roth Prairie Natural Area, AR | Mississippi Lowland Forests | MF094978 |
| 3280 | *Mesocriconema* sp. | F | Apalachicola Bluffs and Ravines Preserve, FL | Southeastern Conifer Forests | MF094989 |
| 3646 | *Mesocriconema* sp. | F | Neches Bottom and Jack Gore Unit, BITH, TX | Piney Woods Forests | MF095005 |
| 3169 | *Mesocriconema* sp. | F | Kellogg-Weaver Dunes SNA, MN | Central Tall Grasslands | MF094974 |
| 3172 | *Mesocriconema* sp. | J | Kellogg-Weaver Dunes SNA, MN | Central Tall Grasslands | MF094975 |
| 3174 | *Mesocriconema* sp. | F | Kellogg-Weaver Dunes SNA, MN | Central Tall Grasslands | MF094976 |
| 3431 | *Mesocriconema* sp. | F | Oaky Woods Wildlife Management Area, GA | Southeastern Mixed Forests | MF094997 |
| 3457 | *Mesocriconema* sp. | F | Oaky Woods Wildlife Management Area, GA | Southeastern Mixed Forests | MF094999 |
| 3460 | *Mesocriconema* sp. | F | Oaky Woods Wildlife Management Area, GA | Southeastern Mixed Forests | MF095000 |
| 2900 | *Mesocriconema* sp. | F | Barta Brothers Ranch, NE | Nebraska Sandhills Mixed Grasslands | MF094944 |
| 3966 | *Mesocriconema* sp. | F | Turkey Creek Unit, BITH, TX | Piney Woods Forests | MF095011 |
| 2902 | *Mesocriconema* sp. | F | Barta Brothers Ranch, NE | Nebraska Sandhills Mixed Grasslands | MF094945 |
| 362 | *Mesocriconema curvatum* | F | Treasure Co, MT | Northern Short Grasslands | MF094891 |
| 3059 | *Mesocriconema* sp. | J | Hayden Prairie Preserve, IA | Central Tall Grasslands | MF094967 |
| 3050 | *Mesocriconema rusticum* | F | Hayden Prairie Preserve, IA | Central Tall Grasslands | MF094965 |
| 3085 | *Mesocriconema rusticum* | F | Hayden Prairie Preserve, IA | Central Tall Grasslands | MF094972 |
| 5572 | *Mesocriconema rusticum* | F | Akershus County, Norway | Scandinavian and Russian Taiga | MF095017 |
| 1242 | *Mesocriconema onoense* | F | Auburn University, Auburn, AL | Southeastern Mixed Forests | MF094909 |
| 502 | *Mesocriconema ornatum* | F | USDA Southeastern Fruit and Nut Tree Reseach Station, GA | Southeastern Mixed Forests | MF094893 |
| P184027 | *Discocriconemella limitanea* | F | Las Cruces Biological Station, Costa Rica | Isthmian-Pacific Moist forests | MF095031 |
| P184031 | *Discocriconemella limitanea* | F | Las Cruces Biological Station, Costa Rica | Isthmian-Pacific Moist forests | MF095032 |
| 1288 | *Mesocriconema sphaerocephalum* | F | Spring Creek Prairie, NE | Central Tall Grasslands | MF094912 |
| 1455 | *Mesocriconema sphaerocephalum* | F | Juan Diaz County, Puerto Rico | Puerto Rican Moist Forests | MF094921 |
| 1157 | *Lobocriconema thornei* | F | Tippecanoe County, IN | Central Forest-Grassland Transition Zone | MF094904 |
| 3317 | *Lobocriconema* sp. | F | Twin Creeks, GRSM, TN | Appalachian-Blue Ridge Forests | MF094991 |
| 3382 | *Lobocriconema thornei* | F | Porcupine Mountains Wilderness State Park, MI | Western Great Lakes Forest | MF094995 |
| 3368 | *Lobocriconema thornei* | F | Crane Hollow Preserve, OH | Appalachian Mixed Mesophytic Forests | MF094994 |
| 2525 | *Lobocriconema thornei* | F | Michigan State University, East Lansing, MI | Southern Great Lakes Forests | MF094928 |
| 3414 | *Lobocriconema thornei* | F | Parfrey's Glen State Natural Area, WI | Upper Midwest Forest-Savanna Transition Zone | MF094996 |
| 3229 | *Lobocriconema* sp. | F | Ozark National Forest, AR | Central US Hardwood Forests | MF094983 |
| 5563 | *Lobocriconema incrassatum* | F | Emigration Canyon, UT | Wasatch and Uinta Montane Forests | MF095014 |
| 5576 | *Lobocriconema incrassatum* | J | Providence Canyon, Cache County, UT | Wasatch and Uinta Montane Forests | MF095018 |
| 5577 | *Lobocriconema incrassatum* | F | Providence Canyon, Cache County, UT | Wasatch and Uinta Montane Forests | MF095019 |
| 3675 | *Lobocriconema* sp. | F | Canyonlands, BITH, TX | Piney Woods Forests | MF095009 |
| 3677 | *Lobocriconema* sp. | F | Canyonlands, BITH, TX | Piney Woods Forests | MF095010 |
| 1206 | *Lobocriconema* sp. | F | Pine Cliff State Natural Area, WI | Upper Midwest Forest-Savanna Transition Zone | MF094905 |
| 3267 | *Lobocriconema* sp. | F | Ozark National Forest, AR | Central US Hardwood Forests | MF094987 |
| 894 | *Lobocriconema* sp. | F | Chimney Creek, GRSM, TN | Appalachian-Blue Ridge Forests | MF094898 |
| 3203 | *Lobocriconema* sp. | F | Ichetucknee Springs State Park, FL | Southeastern Conifer Forests | MF094981 |
| 577 | *Lobocriconema* sp. | F | Ichetucknee Springs State Park, FL | Southeastern Conifer Forests | MF094895 |
| 2273 | *Lobocriconema* sp. | F | Roy E. Larsen Sandyland Sanctuary, TX | Piney Woods Forests | MF094924 |
| 2914 | *Lobocriconema* sp. | F | Aurora Prairie Preserve, SD | Central Tall Grasslands | MF094947 |
| 1382 | *Lobocriconema* sp. | J | Spring Creek Prairie, NE | Central Tall Grasslands | MF094917 |
| 1395 | *Lobocriconema* sp. | F | Leiter Manxion & Turkey Run, GWMP, VA | Southeastern Mixed Forests | MF094918 |
| 1 | *Lobocriconema* sp. | F | Timmas Farm State Ecological Preserve, NE | Central Tall Grasslands | MF094889 |
| 2862 | *Lobocriconema* sp. | F | Konza Prairie Biological Station, KS | Flint Hills Tall Grasslands | MF094943 |
| 3057 | *Lobocriconema* sp. | F | Tunica Hills State Wildlife Refuge, LA | Mississippi Lowland Forests | MF094966 |
| 3068 | *Lobocriconema* sp. | F | Cataloochee, GRSM, NC | Appalachian-Blue Ridge Forests | MF094969 |
| 3195 | *Lobocriconema* sp. | F | Ichetucknee Springs State Park, FL | Southeastern Conifer Forests | MF094979 |
| 3196 | *Lobocriconema* sp. | F | Ichetucknee Springs State Park, FL | Southeastern Conifer Forests | MF094980 |
| 3249 | *Lobocriconema* sp. | F | Oconaluftee, GRSM, NC | Appalachian-Blue Ridge Forests | MF094984 |
| 3257 | *Lobocriconema* sp. | F | Ozark National Forest, AR | Central US Hardwood Forests | MF094985 |
| 3297 | *Lobocriconema* sp. | F | Torreya State Park, FL | Southeastern Conifer Forests | MF094990 |
| 3615 | *Lobocriconema* sp. | F | Big Sandy Creek Unit, BITH, TX | Piney Woods Forests | MF095003 |
| 3645 | *Lobocriconema warrenense* | F | Big Sandy Creek Unit, BITH, TX | Piney Woods Forests | MF095004 |
| 3663 | *Lobocriconema* sp. | F | Lance Rosier Unit, BITH, TX | Piney Woods Forests | MF095006 |
| 3668 | *Lobocriconema warrenense* | F | Big Sandy Creek Unit, BITH, TX | Piney Woods Forests | MF095007 |
| 5583 | *Lobocriconema warrenense* | F | St. Francis National Forest, AR | Mississippi Lowland Forests | MF095020 |
| 1101 | *Criconemoides informis* | F | Custer Gallatin National Forest, MT | South Central Rockies Forests | MF094902 |
| 1231 | *Bakernema inaequale* | F | Pauchaug State Forest, WI | Northeastern Coastal Forests | MF094908 |
| 1484 | *Bakernema inaequale* | F | Arlington Woods, GWMP, VA | Southeastern Mixed Forests | MF094923 |
| 1460 | *Bakernema inaequale* | F | Purchase Knob, GRSM, NC | Appalachian-Blue Ridge Forests | MF094922 |
| 2962 | *Hemicycliophora* cf*. sphagni* | F | Hobe Sound National Wildlife Refuge, FL | Florida Sand Pine Scrub | MF094951 |
| 3040 | *Hemicycliophora* sp. | J | Uinta-Wasatch-Cache National Forest, UT | Wasatch and Uinta Montane Forests | MF094963 |
| 3041 | *Hemicycliophora* sp. | J | Uinta-Wasatch-Cache National Forest, UT | Wasatch and Uinta Montane Forests | MF094964 |
| 1261 | *Hemicycliophora* cf. *macristhmus* | F | Great Falls Park, GWMP, VA | Southeastern Mixed Forests | MF094911 |
| 5565 | *Criconemoides annulatus* | F | Emigration Canyon, UT | Wasatch and Uinta Montane Forests | MF095015 |
| 5566 | *Criconemoides annulatus* | F | Emigration Canyon, UT | Wasatch and Uinta Montane Forests | MF095016 |
| 5765 | *Criconemoides annulatus* | F | Roosevelt National Forest, CO | Colorado Rockies Forests | MF095024 |
| 3669 | *Criconemoides annulatus* | F | Canyonlands Unit, BITH, TX | Piney Woods Forests | MF095008 |
| 1099 | *Criconemoides annulatus* | F | Custer Gallatin National Forest, MT | South Central Rockies Forests | MF094901 |
| 1212 | *Xenocriconemella macrodora* | F | Accotink Watershed, VA | Southeastern Mixed Forests | MF094906 |
| 1213 | *Xenocriconemella macrodora* | F | Accotink Watershed, VA | Southeastern Mixed Forests | MF094907 |
| 3483 | *Xenocriconemella macrodora* | F | Wakulla Springs State Park, FL | Southeastern Conifer Forests | MF095001 |
| 3141 | *Xenocriconemella macrodora* | F | Ponce de Leon State Park, FL | Southeastern Conifer Forests | MF094973 |
| 1404 | *Criconema permistum* | F | Leiter Mansion & Turkey Run, GWMP, VA | Southeastern Mixed Forests | MF094920 |
| 923 | *Criconema permistum* | F | Laurel Falls Trail, GRSM, TN | Appalachian-Blue Ridge Forests | MF094899 |
| 927 | *Criconema permistum* | F | Laurel Falls Trail, GRSM, TN | Appalachian-Blue Ridge Forests | MF094900 |
| 2460 | *Criconema* sp. | F | Beaumont Unit, BITH, TX | Piney Woods Forests | MF094925 |
| 2686 | *Criconema* sp. | F | Auburn University, Auburn, AL | Southeastern Mixed Forests | MF094931 |
| 5788 | *Criconemoides informis* | J | Uncompahgre National Forest, CO | Colorado Rockies Forests | MF095025 |
| 1328 | *Criconema mutabile* | F | Fresno County, CA | California Central Valley Grasslands | MF094914 |
| 3432 | *Criconema mutabile* | F | Oaky Woods Wildlife Management Area, GA | Southeastern Mixed Forests | MF094998 |
| 5545 | *Hemicriconemoides* sp. | F | Noh Bo Forest, Thailand | Kayah-Karen Montane Rain Forests | MF095013 |
| 2766 | *Hemicriconemoides chitwoodi* | F | Anderson County, SC | Southeastern Mixed Forests | MF094939 |
| 3270 | *Discocriconemella* sp. | F | Noh Bo Forest, Thailand | Kayah-Karen Montane Rain Forests | MF094988 |
| 3004 | *Ogma octangularis* | F | Goshen Prong, GRSM, TN | Appalachian-Blue Ridge Forests | MF094961 |
| 3005 | *Ogma octangularis* | F | Goshen Prong, GRSM, TN | Appalachian-Blue Ridge Forests | MF094962 |
| 2991 | *Ogma octangularis* | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094956 |
| 2975 | *Ogma decalineatus* | F | Red Rock Prairie Preserve, MN | Central Tall Grasslands | MF094952 |
| 2976 | *Ogma decalineatus* | F | Red Rock Prairie Preserve, MN | Central Tall Grasslands | MF094953 |
| 2985 | *Ogma octangularis* | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094954 |
| 2993 | *Criconema petasum* | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094958 |
| 2994 | *Criconema petasum* | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094959 |
| 2522 | *Criconema petasum* | F | Michigan State University, East Lansing, MI | Southern Great Lakes Forests | MF094927 |
| 2635 | *Criconema loofi* | F | Brushy Mtn., GRSM, TN | Appalachian-Blue Ridge Forests | KX344497 |
| 1247 | *Criconema* sp. | F | Nine-Mile Prairie, NE | Central Tall Grasslands | MF094910 |
| 1399 | *Criconema* sp. | F | Nine-Mile Prairie, NE | Central Tall Grasslands | MF094919 |
| 3067 | *Criconema sphagni* | F | Cataloochee, GRSM, NC | Appalachian-Blue Ridge Forests | MF094968 |
| 3069 | *Criconema sphagni* | F | Cataloochee, GRSM, NC | Appalachian-Blue Ridge Forests | MF094970 |
| 3220 | *Criconema sphagni* | F | Purchase Knob, GRSM, NC | Appalachian-Blue Ridge Forests | MF094982 |
| 2808 | *Criconema sphagni* | F | Twin Creeks, GRSM, TN | Appalachian-Blue Ridge Forests | MF094942 |
| 2807 | *Criconema sphagni* | J | Twin Creeks, GRSM, TN | Appalachian-Blue Ridge Forests | MF094941 |
| 2759 | *Criconema sphagni* | F | Trillium Gap, GRSM, TN | Appalachian-Blue Ridge Forests | MF094936 |
| 2758 | *Criconema sphagni* | F | Trillium Gap, GRSM, TN | Appalachian-Blue Ridge Forests | MF094935 |
| 2724 | *Criconema longulum* | J | Gregory Bald, GRSM, NC | Appalachian-Blue Ridge Forests | KX344495 |
| 5978 | *Criconema* cf. *acriculum* | F | Brushy Mtn., GRSM, TN | Appalachian-Blue Ridge Forests | KX344496 |
| 3356 | *Ogma octangularis* | F | Raspberry Island, APIS, WI | Western Great Lakes Forest | MF094993 |
| 2753 | *Ogma seymouri* | F | Tongass National Forest, AK | Northern Pacific Coastal Forests | MF094933 |
| 3262 | *Ogma murrayi* | F | Ozark National Forest, AR | Central US Hardwood Forests | MF094986 |
| 2948 | *Crossonema menzeli* | F | West Point, GRSM, TN | Appalachian-Blue Ridge Forests | MF094950 |
| 2989 | *Crossonema* sp. | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094955 |
| 2762 | *Crossonema menzeli* | F | Tongass National Forest, AK | Northern Pacific Coastal Forests | MF094938 |
| 2761 | *Crossonema menzeli* | F | Tongass National Forest, AK | Northern Pacific Coastal Forests | MF094937 |
| 2755 | *Crossonema menzeli* | F | Trillium Gap, GRSM, TN | Appalachian-Blue Ridge Forests | MF094934 |
| 2995 | *Crossonema fimbriatum* | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094960 |
| 5843 | *Crossonema fimbriatum* | F | Simes Tract, Harvard Forest LTER, MA | New England Acadian Forests | MF095027 |
| 5842 | *Crossonema fimbriatum* | F | Simes Tract, Harvard Forest LTER, MA | New England Acadian Forests | MF095026 |
| 2992 | *Crossonema* sp. | F | Gifford Woods State Park, VT | New England Acadian Forests | MF094957 |
| 2779 | *Ogma seymouri* | F | Tongass National Forest, AK | Northern Pacific Coastal Forests | MF094940 |
| 2636 | *Ogma seymouri* | F | Brushy Mtn., GRSM, TN | Appalachian-Blue Ridge Forests | KX344498 |
| 2573 | *Ogma murrayi* | F | Santa Cruz Island Reserve, CA | California Coastal Sage and Chaparral | MF094930 |
| 5921 | *Gracilacus wuae* | J | Ontario, Canada | Eastern Great Lakes lowland forests | MF095028 |
| 5922 | *Gracilacus wuae* | J | Ontario, Canada | Eastern Great Lakes lowland forests | MF095029 |
| 2508 | *Paratylenchus* sp. | F | Jepson Prairie Preserve, CA | California Central Valley Grasslands | MF094926 |
| 5748 | *Gracilacus* sp. | F | Santa Fe National Forest, NM | Colorado Rockies Forests | MF095023 |
| 878 | *Paratylenchus projectus* | F | Steele County, ND | Northern Mixed Grasslands | MF094897 |
| 281 | *Paratylenchus projectus* | F | Hitchcock County, NE | Central and Southern Mixed Grasslands | MF094890 |

S2. Table of GenBank accession numbers with suspect species names.

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| GenBank accession number | Species name | Reason for concern |
| KJ934177.1 | *Mesocriconema xenoplax* | Does not group with other *M. xenoplax* including topotype |
| KJ934176.1 | *Mesocriconema xenoplax* | Does not group with other *M. xenoplax* including topotype |
| KJ934180.1 | *Mesocriconema xenoplax* | Does not group with other *M. xenoplax* including topotype |
| AY284625.1 | *Mesocriconema xenoplax* | Does not group with other *M. xenoplax* including topotype |
| AY284626.1 | *Mesocriconema xenoplax* | Does not group with other *M. xenoplax* including topotype |
| AY284627.1 | *Mesocriconema xenoplax* | Does not group with other *M. xenoplax* including topotype |
| KJ934183.1 | *Mesocriconema sphaerocephalum* | Does not group with other *M. sphaerocephalum* |
| KJ934175.1 | *Ogma* sp. | Falls outside clade with other *Ogma* species |