



Dr. MUHAMMAD TAYYAB

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Current Address: Institute of Biotechnology and Genetic Engineering (IBGE)
The university of Agriculture Peshawar (Jan 2018-till date)

SUMMARY

15 years of Research Experience in biology covering various aspects from Plant Biology to Bacterial work.

- Detailed understanding of protocols for plant biology work
- Well versed with planning and execution of scientific plans
- Good understanding of research based communication
- Advanced analytical and problem solving skills with multitasking abilities

ACADEMIC QUALIFICATION

- **Doctor of Philosophy (PhD) (2013-2017)**

Specialization: Plant developmental biology and Molecular Biology, **University of Heidelberg (Germany)**

- **Master of Philosophy (M.Phil.) (2009-2011)**

Specialization: Biotechnology, **IBGE, The University of Agriculture Peshawar, Pakistan.**

- **Bachelor of Science (B.Sc. (Hons)) (2003-2007)**

Specialization: Biotechnology, **The University of Peshawar Pakistan.**

- **Faculty of Science (F.Sc.) (2001-2002)**

Specialization: Biological Science, **Board of Intermediate & Secondary Education Peshawar (BISEP).**

Honors / Awards

2012, 4 years Scholarship for PhD by H.E.C (Higher Education Commission of Pakistan).

Projects Awarded

- Startup grant awarded by HEC for the project “Exploring the role of Retinoblastoma related gene (*rbr-4*) in salinity stress in Arabidopsis Thaliana (**completed as principal investigator**)
- Overproduction of glutathione via sulfur metabolic engineering for enhanced phytoremediation and improved iron nutrition. (**As a Co-PI**) in progress

List of Publications

1. **Compartment-Specific Expression of *NtSAT4* in *Brassica napus* Enhances Arsenic Tolerance Without Ecological Trade-offs.**
Fariha Qahar¹, **Muhammad Tayyab¹**, Hala Rajab^{1,2}, Muhammad Sayyar Khan^{1*} (**Under review in Journal of Plant Molecular Biology**)
2. **Evaluation of Gamma Rays-Induced Effects on Vegetative, Floral and Yield Parameters of Okra Varieties**
Saira Naz, **Muhammad Tayyab**, Wasif Rasool, Abdul Muqet Nawaz, Maham Jamshed, Iqra Arooj, Adnan Shehzad, Musa Khan and Nasr Ullah Khan (**Journal of Plant Health, Ecology and Evolution ,2026**)
3. **Investigation of Changes in the Profile of Fatty Acids and Growth Traits in Response to Waterlogging/Flooding Stress**

4. Surveillance of citrus canker: a threat to Pakistani citrus industry-status and distribution of citrus canker in major citrus growing regions of Pakistan (Journal of Plant Pathology)

Safi Ullah, Zia ur Rehman, **Muhammad Tayyab**, Aamir Iqbal, Abdullah Jalal, Jinbiao Ma, Muhammad Awais & Sajid Ali (2026)

5. Green synthesized zinc oxide nanoparticles mediated by *Dysphania botrys* extract: Structural characterization and biological applications

Abdul Nasir ^{a†} **Muhammad Tayyab** ,^{a†} Syed Jehangir Shah,^a Muhammad Sayyar Khan ,^a Heba I. Mohamed ,^{b,*} Haiam O. Elkatry ,^c Marwa Ezz El-Din Ibrahim ,^c Hossam S. El-Beltagi ,^d Mohamed El Oirdi ,^e and Abdelrahman R. Ahmed ,^{c,*}(2026)

6. Elucidation of antioxidant activity and metabolite profiling of the marine soft coral *Litophyton* spp.

Fatin Amira Fauzi^{1,2}, Yoong Soon Yong^{3,4}, Jen Kit Tan⁵, Eric Tzyy Jiann Chong⁶, Gilbert Ringgit⁶, Shafiquzzaman Siddiquee⁶, **Muhammad Tayyab**⁷, Rossita Shapawi² and Muhammad Dawood Shah^{2*} 2026 (Blue Biotechnology) (2026)

7. Phytochemical analysis and biological activities of *nigella sativa* collected from south waziristan, Pakistan

Zahra A, Ullah N, Jamshed M, Muddasir M, Nasir A, Rehman HU, **Tayyab M**, Sana A, Ullah I, Khan NU*. (2025) Annual Methodological Archive Research Review,

8. Antibacterial and anti-inflammatory activities of *ocimum sanctum* essential oil collected from taunsa sharif, pakistan.

Jamshed M, Ullah N, Muddasir M, Qureshi RS, Jamal M, Rehman HU, **Tayyab M**, Sana A, Ullah I, Khan NU*. (2025) Annual Methodological Archive Research Review,

9. Decoding the expression patterns and characterisation of calmodulin and calmodulin-like gene families in watermelon (*Citrullus lanatus*) under abiotic stresses

Ali AslamA,^{*,#} , Ruimin ZhangB,[#], Muhammad WaseemC,[#] , Zhang HuangB, Ashir MasroorD, Munazza KiranE, Temoor AhmedF,G, **Muhammad Tayyab**H, Rabia NawazI, Muhammad AzamJ, Muhammad Naveed BaburK, Sher MuhammadA , Muhammad Khuram RazzaqA, Zainab AhmadI, Qinghua ShiB, Ammara TahirA and Idrees Khan (Functional plant biology, May,2025)

10. Novel mutations in exon 2 of follistatin (FST) gene associated with wool fiber diameter in sheep

Tahira Mir, Muhammad Ibrahim, Muhammad Siraj, Sajid Ali Khan Bangash, Sher Hayat Khan, Majid Khan, **Muhammad Tayyab**, Sohail Ahmad (Small Ruminant Research December,2024)

11. Decrypting the multi-genome data for chimeric vaccine designing against the antibiotic-resistant *Yersinia pestis*.

Asifa Sarfraz 1, Sayyada Qurrat-Ul-Ain Fatima 1, Muhammad Shehroz 2, Iqra Ahmad 1, Aqal Zaman 3, Umar Nishan 4, **Muhammad Tayyab** 5, Sheheryar 6, Arlindo Alencar Moura 6, Riaz Ullah 7, Essam A Ali 8, Mohibullah Shah 9 (Int Immunopharmacol,2024)

12. Analysis of E2F1 single-nucleotide polymorphisms reveals deleterious non-synonymous substitutions that disrupt E2F1-RB protein interaction in cancer

Muhammad Suleman 1, Aishma Khattak 2, Fazal Akbar 3, Muhammad Rizwan 4, **Muhammad Tayyab** 5, Muhammad Yousaf 6, Abbas Khan 7, Norah A Albekairi 8, Abdelali Agouni 9, Sergio Crovella 10 (Int J. Biol Macromol, 2024)

13. Biogenic synthesis of silver nanoparticles using *Rubus fruticosus* extract and Their antibacterial efficacy against *Erwinia caratovora* and *Ralstonia solanacearum* phytopathogens.

14. **Molecular Characterization of diverse Wheat Genetic Resources for Resistance to Yellow Rust Pathogen (*Puccinia striiformis*)**
Muhammad Saeed, Muhammad Ibrahim, Waqas Ahmad, **Muhammad Tayyab**, Safira Attacha, Mudassar Nawaz Khan, Sultan Akbar Jadoon, Syed Jehangir Shah, Shaista Zeb, Liaqat Shah, Fazal Munsif, Ahmad Zubair, Jie Lu, Hongqi Si *, Chuanxi Ma (**Agronomy Journal Nov 2022**)
15. **Targeted metabolomics reveals fatty acid abundance adjustments as playing a crucial role in drought-stress response and post-drought recovery in wheat. (frontier in genetics, Nov 2022)**
Safi Ullah¹, Mudassar Nawaz Khan², Sumaira Salahuddin Lodhi³, Iftikhar Ahmed⁵ **Muhammad Tayyab**¹, Tariq Mahmood⁴, Israr Ud Din¹, Majid khan¹, Quahir Sohail ^{1,6} Muhammad Akram ⁷
16. **A comparative performance of phytochemicals, green synthesized silver nanoparticles and green synthesized of copper nanoparticles loaded textiles to avoid from nosocomial infections**
Muhammad Farrukh Tahir ¹ , Muhammad Zaman Khan ^{2,*} , Safira Attacha ³ , Noreen Asim ³ , **Muhammad Tayyab** ³ , Azam Ali ² , Jiri Militky ² and Blanka Tomková (**Nanomaterial, October,2022**)
17. **Effect of salt stress on maize (*Zea mays* L.) antioxidants and ROS scavenging mechanism**
Faran Durrani¹, Noor Mahal¹ , Nisar Ahmad² , Zamarud Shah² , Ihsan Ullah¹ , Mir Sadiq Shah¹ , **Muhammad Tayyab**³ and Rafi Ullah⁴ (**March,2022**)
18. **Cadmium and arsenic provoke mostly distinct but partly overlapping responses in *Brassica juncea*.**
Allah Dad Khan ^A, Muhammad Sayyar Khan ^{A^C} , Sajid Ali Khan Bangash ^A , Kashif Naeem ^B , Abdullah Jalal ^A and **Muhammad Tayyab** ⁰ **september, 2021**
19. **Genome wide association study and phylogenetic analysis of novel SARS-COV-2 virus among different countries**
Syed Umair Ahmad¹, Muhammad Shehzad Khan², Zainab Jan¹, Nayab Khan³, Asif Ali, Naumana Rehman⁵, Mohsina Haq⁶, Umama Khan⁷, Zohaib Bashir^{1*}, **Muhammad Tayyab**⁸, Ihteshamul Haq^{9*}, Shumaila Bakht¹⁰ and Fazli Zahir¹¹(**July 2021**)
20. **Dengue outbreak 2018 in district Shangla KPK; clinical features and laboratory markers of dengue virus infection**
Faheem Anwar¹ , **Muhammad Tayyab**^{*,2}, Muhammad Salman^{**,3} , Abdullah³, Misbahud Din⁴ , Jawad Khan¹ & Ihteshamul Haq⁵
21. **Aberrant imprinting may underlie evolution of parthenogenesis.**
Olga Kirioukhova^{1,2}, Jubin N. Shah¹, Danaé S. Larsen¹, **MuhammadTayyab**¹, Nora E. Mueller¹, Geetha Govind ^{1,10}, Célia Baroux³, Michael Federer³, JacquelineGheyselinck³, Philippa J. Barrell^{3,11}, Hong Ma^{3,4,5}, Stefanie Sprunck⁶, Bruno Huettel⁷, HelenWallace⁸, Ueli Grossniklaus ³ & Amal J. Johnston ^{1,2,3,9} (**Published on 13th July ,2018**)
22. **Depletion of key meiotic genes and transcriptome-wide abiotic stress reprogramming mark early preparatory events ahead of apomeiotic transition in an apomict.**
Jubin N. Shah¹, Olga Kirioukhova^{1,2}, Pallavi Pawar¹, **Muhammad Tayyab**¹, Juan L. Mateo^{1*}, Amal J. Johnston^{1,2*} (September **2016**) *Frontiers in Plant Science*)
23. BAKHT J., **M. TAYYAB**, H. ALI, A. ISLAM AND M. SHAFI: **Effect of the different solvent extracted sample of *Allium sativum* (Linn) on bacteria and fungi. (2011) African Journal of Biotechnology 10 (31): 5910-5915.**
24. BAKHT J., A. ISLAM, H. ALI, **M. TAYYAB** AND M. SHAFI: **Antimicrobial potentials of *Eclipta alba* by disc diffusion methods. (2011) African Journal of Biotechnology 10 (39): 7658-7667.**

25. BAKHT J., H. ALI, M.A. KHAN, M. SAEED, M. SHAFI, A. ISLAM AND M. TAYYAB: Antimicrobial activities of different solvents extracted samples of *Linum usitatissimum* by disc diffusion method. (2011) African Journal of Biotechnology 10 (85): 19825-19835.



RESEARCH SUPERVISION

Name of student	Role	Level	Title of research Project
Muhammad Qasim	Supervisor	M.Phil.	A story beyond cell cycle and differentiation, <i>rbr-4</i> has a role in salinity stress (Degree Awarded) 2020
Momina Asif	Supervisor	M.Phil.	Evaluating the role of endophytic bacteria in plant growth promotion and salinity tolerance in wheat (Degree Awarded) 2021
Faiza Anjum	Supervisor	M.Phil.	Effect of Zinc Oxide nanoparticles on callus proliferation and secondary metabolites production in <i>ARTEMISIA SCOPARIA</i> (Degree Awarded) 2023
Faryal Tehsin	Supervisor	M.Phil.	The influence of gamma irradiation doses on the morphological and physiological properties of different wheat varieties (Degree Awarded) 2023
Zahid Ali	Supervisor	M.Phil.	Effect of heavy metal tolerance in wheat mediated by endophytic bacteria and its physiological and biochemical impact on plant (Degree Awarded) 2023
Noor ul ain	Supervisor	M.Phil.	Increasing rice tolerance under salinity stress by exogenous application of melatonin and ethanol treatment. (Degree Awarded) 2023
Sitara Khan	Supervisor	M.Phil.	Combined effects of Zinc and boron seed priming and foliar application on rice growth at different developmental stages (Degree Awarded) 2023
Muhammad Abdullah	Supervisor	M.Phil.	The effect of foliar application of acetic acid on chlorophyll & carotenoid contents in transgenic <i>brassica napus</i> under cadmium stress” (Degree Awarded) 2023
Syed Izhar Ullah Shah	Supervisor	M.Phil.	Deciphering Stress Responses of Two Wheat Varieties to NaCl and KCl Salt Stress on Morpho-biochemical Perspectives (Degree Awarded) 2024
Nusrat Ullah	Supervisor	M.Phil.	Investigating the role of Foliar ZnO nanoparticles application in enhancing drought stress tolerance in transgenic oil seed rape (<i>Brassica Napus</i>) (Degree Awarded,2025)
Arif Ullah	Supervisor	M.Phil.	To study Salicylic acid-mediated defense responses in transgenic (<i>Brassica Napus</i>) under salinity stress on physiological responses. (Degree Awarded,2025)
Abdul Nasir	Supervisor	M.Phil.	Green synthesis, of Zinc oxide nanoparticles from <i>Dysphania botrys</i> and their antimicrobial, antioxidant, and cytotoxic potential. (Degree Awarded,2025)
Aneesa	Supervisor	M.Phil.	<i>PORTULACA OLERACEA</i> -DERIVED ZNO NANOPARTICLES VIA GREEN SYNTHESIS FOR ENHANCING DROUGHT RESILIENCE IN LENTILS (<i>LENS CULINARIS</i>) (Degree Awarded,2026)
Amir-e-Hamza	Supervisor	M.Phil.	Evaluation of toxicity and antioxidant enzyme modulation by <i>aerva javanica</i> derived zinc oxide nanoparticles in zebrafish (<i>danio rerio</i>) (Degree Awarded,2026)
Farishta Asman Khan	Supervisor	M.Phil.	To study phyto-genic synthesis, characterization and its multi-functional potential of zinc oxide nanoparticles from <i>calotropis gigantea</i> (Degree Awarded,2026)

			
Rabia Siddiqi	Supervisor	M.Phil.	Phyto-mediated synthesis of ZnO nanoparticles via <i>Verbascum thapsus</i> leaf extract: characterization and its biomedical potentials (Degree Awarded, 2026)
Wajeeha	Supervisor	M.Phil.	Decoding green tea phytochemicals as targeted therapeutics for colorectal cancer: a GCMS driven and structure-guided approach (Research in Progress)

MAJOR MEMBER/CO-SUPERVISOR

Muhammad Asim Zahir	Major Member	M.Phil.	Effect of high salt stress on morphology and growth of <i>BRASSICA NAPUS</i> in hydroponics system (Degree Awarded)
Muhammad Jawad	Major Member	M.Phil.	“Functional Characterization of carotenogenic genes <i>CrtB</i> , <i>CrBKT</i> , and <i>BHY</i> in transgenic <i>Brassica napus</i> ” (Degree Awarded)
Brehana Khan	Major Member	M.Phil.	“Assessment of morphological and biochemical response of different maize lines under water limiting conditions” (Degree Awarded)
Ulfat Yasmeen	Major Member	M.Phil.	Performance of newly developed maize lines under salt stress conditions in a Hydroponic system (Degree Awarded)
Umair Munir	Major Member	M.Phil.	Identifying genetic differences and the role of mutants in alleviating drought stress in newly developed maize lines (Degree Awarded) 2023
Abrar Hussain	Major Member	M.Phil.	Green synthesis, Characterization and biological activities of Zinc oxide nanoparticles using leaf extracts of indigenous <i>Seriphidium Kurramense</i> (Degree Awarded) 2024

B.SC (HONS) INTERNSHIP SUPERVISION

Malik Mustafa Ahmad, Atta Ullah	Supervisor	B.S (Hons)	<i>In Silico</i> drug designing for multi drug resistant mycobacterium tuberculosis (MDR-TB) targeting Enoyl-Acyl carrier protein reductase enzyme (Enoyl -ACP Reductase) (Degree Awarded 2026)
Muhammad Ibrahim Khan Muhammad Hudair	Supervisor	B.Sc. (Hons)	<i>In Silico</i> study of keratin type1 gene family (in Primates) to improve their intermediate filaments (Degree Awarded 2025)
Ghufran Laiba Arshad Aiza Alamgir	Supervisor	B.Sc. (Hons)	Green synthesis and characterization of Copper sulphate nanoparticles using seed extracts of <i>Medicago lupulina</i> (Degree Awarded 2025)
Anam Naveed Amina Ubaid	Supervisor	B.Sc. (Hons)	To study the effect of Salicylic Acid on transgenic <i>Brassica napus</i> under salinity stress (Degree Awarded 2024)

Maryam Sarfaraz			 europass
Amir -e- Hamaz, Abdur Rehman	Supervisor	B.Sc. (Hons)	A comparative study of green synthesized Zin Oxide nanoparticles confers drought tolerance in <i>Brassica Napus</i> (Degree Awarded 2024)
Kaleem Ullah Ijaz Ahmad	Supervisor	B.Sc. (Hons)	Effect of NaCl and KCl salt on flag leaf development of selected wheat varieties (Atta Habib and Ghaneemat IBGE) Degree Awarded 2023)
Umaina Khan Maryam Urooj	Supervisor	B.Sc. (Hons)	Acetic acid as a potential modifier for physiological enhancement and cadmium stress mitigation in transgenic <i>Brassica Juncea</i> (Degree Awarded 2023)
Umama Zaman	Supervisor	B.Sc. (Hons)	To study the synergistic effect of orange and banana peels as organic fertilizer on the growth of rice (<i>Oryza Sativa</i>) (Spring 2022)
Munazza Hussain	Supervisor	B.Sc. (Hons)	To study the effect of orange peel as organic fertilizer in powder and foliar spray in rice (<i>Oryza Sativa</i>) growth and development (Spring 2022)
Haris Jan	Supervisor	B.Sc. (Hons)	Effect of caffeine on maize morpho-physiological behaviour. (Spring 2022)
Abdul Jabbar	Supervisor	B.Sc. (Hons)	To study dosage-dependent responses of gamma radiation on wheat varieties for some morpho-physiological improvements (Spring 2022)
a) Shahab Alam b) Mohammad Shoaib	Supervisor	BSc. (Hons)	evaluating the role of endophytic bacteria in plant growth promotion and heavy metals tolerance in wheat. Spring 2021. (Degree Awarded)
a) Saba Saeed b) Nazish	Supervisor	B.Sc. (Hons)	Molecular Characterization of overexpressor of <i>NTSAT4</i> gene in targeted mitochondria and plastids 2020. (Degree Awarded)
c) Sidra Rafi d) Rehmat Gul	Supervisor	B.Sc. (Hons)	Molecular Characterization of overexpressor of <i>NTSAT4</i> gene in targeted cytosolic region. 2020. (Degree Awarded)
Faizan Akbar, Syed Dildar Hussain	Supervisor	B.Sc. (Hons)	Isolation and characterization of halophytic endophytic bacteria from the saline soil of “KARAK” Fall 2019 (Degree Awarded)
a) Hafiz Muhammad Abbas, b) Mohsin Ali, c) Sabeeha Irum	Supervisor	B.Sc. (Hons)	Screening of plant growth promoting endophytic bacteria for salinity stress tolerance. Fall 2019 (Degree Awarded)
a) Sajjad Ahmad, b) Zeeshan Ahmad c) Aftab Ahmad d) Mazhar Ali	Supervisor	B.Sc. (Hons)	Effect of salinity stress on different physiological parameter of <i>Arabidopsis Thaliana</i> (Col-0) Fall,2018(Degree Awarded)
Faryal Tehsin	Supervisor	B.Sc. (Hons)	To study the response of <i>retinoblastoma</i> mutant (<i>rbr-4</i>) in salinity stress in <i>Arabidopsis thaliana</i> . Fall,2017(Degree Awarded)

TEACHING EXPERIENCE

- **Genomics In Agriculture (Spring ,2026)**
- **Special Topics in Bioinformatics** (Spring 2025, Spring 2026)
- **Genomics, Proteomics & Metabolomics:** Fall 2024
- **Introduction to Bioinformatics:** Fall, 2023

- **Nano-biotechnology:** Fall 2017, Fall 2019, Spring 2021, Spring 2022, Spring 2023, Spring 2024, (Spring 2025), Spring 2026
- **Industrial Biotechnology:** Spring 2019, Spring 2020, Fall 2020, Fall 2021, Fall 2022, Fall 2023
- **Cell Biology:** Fall,2017, Fall,2018
- **Cell & Tissue Culture:** Spring, 2018
- **Biosafety & Bioethics:** Fall, 2018, Fall, 2019
- **Plant Biodiversity:** Fall,2021, Fall,2022
- **Genetic Engineering Lab II:** Fall,2021
- **Fundamentals of Biotechnology:** Spring,2022, Spring,2023



RESEARCH INTEREST

Plant developmental biology and Male germline development, plant response to abiotic stresses and study its molecular mechanism, Plants microbes' interactions, phytoremediation, crop improvement strategies, Plants Metabolism.

TRAINING / WORKSHOPS UNDERTAKEN

S,NO	TITLE	Organizing Institute / Location	Date
1	RNA based techniques (RT-PCR), QuantStudioTM 3D Digital PCR System	University of Heidelberg Germany	October 24, 2013
2	LIVE Imaging in 3D Confocal Microscopy (Sample preparation & handling)	University of Heidelberg,Germany	March 02-06, 2015
3	Scientific Writing for the Natural and Life Sciences	University of Heidelberg,Germany	November 19-20, 2015
4	Integration of ICT in Agriculture and Applied Research	The University of Agriculture, Peshawar	February 21, 2019
5	CRISPR/Cas Genome Editing Technology	Islamia University, Peshawar	May 2, 2019
6	Green Spin in Biotechnology	KIBGE, Karachi	August 1-4, 2019
7	New Breeding Technologies for Food and Nutritional Security (Online)	University of Ankara, Turkey	November 30 - December 2, 2021
8	Genetic and Genomic Approaches for Wheat Production Enhancement	Hazara University, Mansehra	March 02-03, 2022
9	Molecular Cloning and Genome Editing (Workshop)	NIGAB, Islamabad	January 16-17, 2024
10	HPLC Techniques (Hands-on Training)	Abasyn University, Peshawar	February 22, 2024

CONFERENCES ATTENDED

S,NO	Event / Presentation Title	Type	Location / Venue	Date	Your Role
1	7th International PhD School Plant Development	PhD School	Wurzburg, Germany	2013	Attendee, Poster Presentation
2	9th Tri National Arabidopsis Meeting (TNAM)	Conference	Heidelberg, Germany	2014	Attendee
3	4th International COS Heidelberg Symposium	Symposium	Heidelberg, Germany	2015	Attendee, Poster Presentation
4	PhD Students Retreat, Centre of Organismal Studies	Retreat	Stuttgart, Germany	2015	Attendee (Oral Presentation)
5	PhD Students Retreat, Centre of Organismal Studies	Retreat	Stuttgart, Germany	2016	Attendee (Oral Presentation)
6	International Conference on “Strategies for ensuring food security in the changing climate”	Conference	The University of Agriculture, Peshawar, Pakistan	October 23-24, 2019	Oral Presenter <i>Title: Climate change and food security, A molecular approach, more hopes than hypes.</i>
7	(Conference at CEMB Lahore)	Conference	CEMB, Lahore, Pakistan	December 24-26, 2021	Oral Presenter <i>*Title: Divergent roles of Arabidopsis thaliana retinoblastoma related (rbr-4) in vegetative growth, male germline development, and abiotic stresses*</i>
8	(Conference at University of Swat)	Conference	University of Swat, Pakistan	May 23-26, 2022	Oral Presenter <i>*Title: A story beyond cell cycle and cell differentiation, retinoblastoma related (rbr-4) has role in male germline development, and abiotic stresses*</i>

REFERENCES

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